

The Iron Age

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The New Siemens System of Gas Firing as Applied to Boilers.

Mr. Frederick Siemens, of Dresden, has, after long and careful trials, satisfied himself that the methods of constructing and making gas metallurgical furnaces on the same principles as those using solid fuel are incorrect. He urges that they should be so arranged that the flame should only radiate heat upon the material to be treated, and not come in actual contact with it, as has hitherto been the case. At the Chester meeting of the Iron and Steel Institute he presented a paper explaining his views with special reference to metallurgical furnaces, to which we referred at the time. Mr. John Head went over much the same ground in a paper read early in January before the South Staffordshire Institute of Iron and Steel Works' Managers. The published reports of these papers do not give any drawings to show in what manner the changes proposed are carried out. That want is supplied, however, by a lecture by Mr. Frederick Siemens himself before the Verein zur Beförderung des Gwerbkleises, at Berlin, which is accompanied by drawings of steel and glass melting furnaces, and of a design for boilers, which we reproduce. The boiler is arranged for direct gas-firing, an ordinary form being chosen to illustrate the application of the system to existing plants. The gas, which is made in a producer, not shown in the drawings, enters into a wide combustion chamber in front of the two tubes. It is provided with two doors for lighting the gas, cleaning the flues, &c. The flues for the gas and air enter into it from below. An arrangement may be easily provided for preheating the air. As will be seen from the drawings, the head of each tube is provided with fire-brick deflector rings, which are also inserted at regular intervals and at the end of every tube. The dimensions of the combustion chamber are so chosen that the flame can develop freely. It then flows through the tubes, the rings preventing contact with the iron. In the return flues the products of combustion are brought into as close contact with the boiler as possible. Mr. Head in his paper says on this subject:

To obtain the greatest benefit from this method of firing it is necessary that the boiler should be worked day and night, for, if only worked in the daytime, the saving effected by the use of gaseous fuel is not so great as when worked continuously. If flame is allowed to touch the sides of a boiler, there is, of necessity, smoke produced on its inside surfaces, and the radiant heat of the flame, not being able to penetrate such an atmosphere of smoke, the water in the boiler cannot get the advantage of it. It will readily be perceived how great a quenching effect the metal of the boiler has upon a flame when it is remembered that the temperature of steam, even at 60 pounds pressure—which is, of course, that of the boiler—is only 311° F., while that of the gaseous flame in contact with it is about 3000° F. In this application the principle has been followed of allowing the active flame to have free space for its development, and for the radiation of its heat within the length of the tube, and not allowing it to touch the sides until after complete combustion has been effected, when the products of combustion may be brought into direct contact with solid bodies. If the flame was allowed to play along the tube in the ordinary way, it would very soon strike against the upper surface and produce soot, but by the arrangement of deflector rings inserted in the tube the gas is not allowed to touch any surface until after complete combustion has been effected, and it will be noticed that by this means the flame has no discolored effect on the tubes. By this arrangement perfect combustion is produced and there is no smoke.

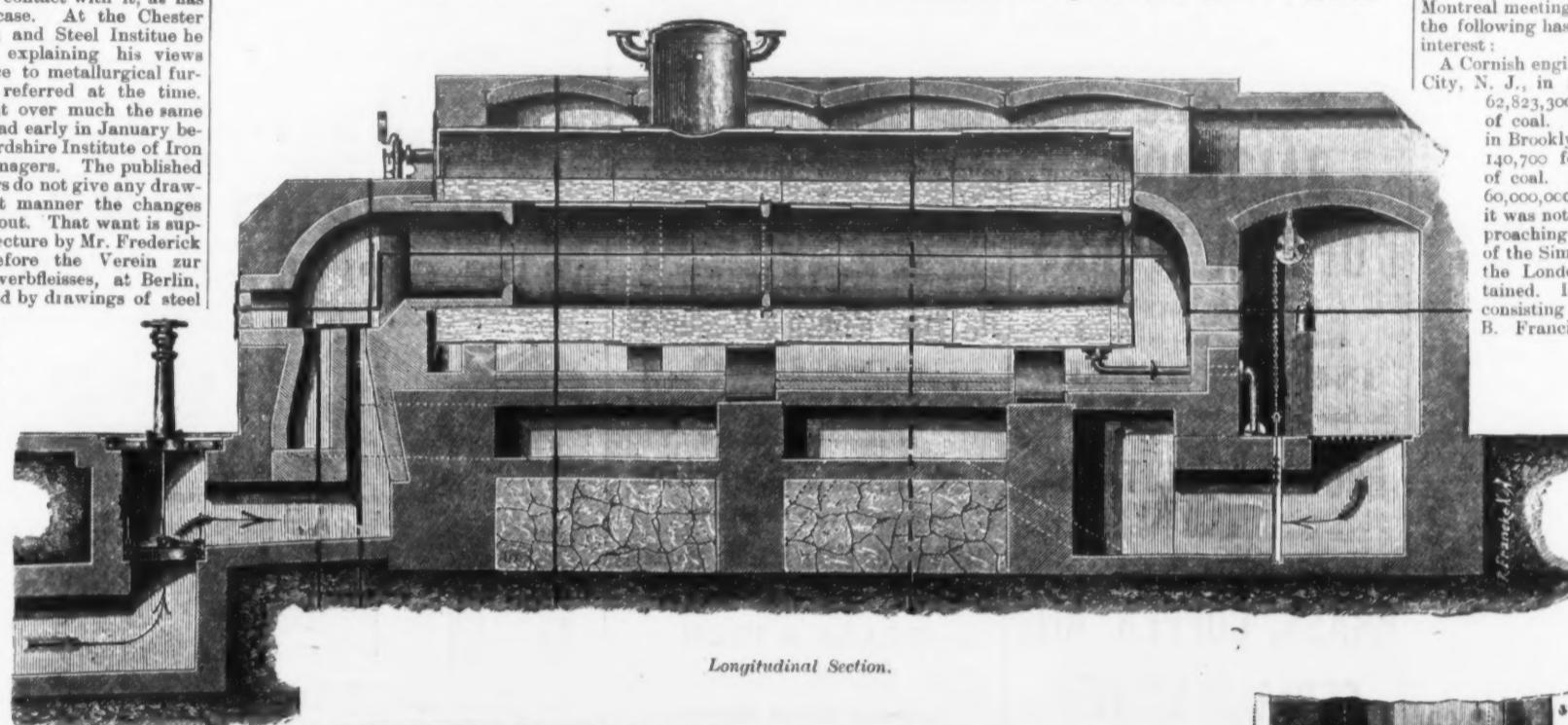
But, besides this, a boiler fired in this manner lasts longer, as the plates are worn away more readily through direct contact with the flame than from any other cause. As the heat of the products of combustion come into direct contact with the sides or flues of the boiler and its regenerators, it is completely utilized, and the maximum of heating effect is thus insured. These results obtained in actual practice prove that almost all heating apparatus used in the arts in which there is no chemical necessity for direct contact of flame with the substances treated will be materially improved by the new method of heating.

The Piece-Price System for an Ohio Prison.

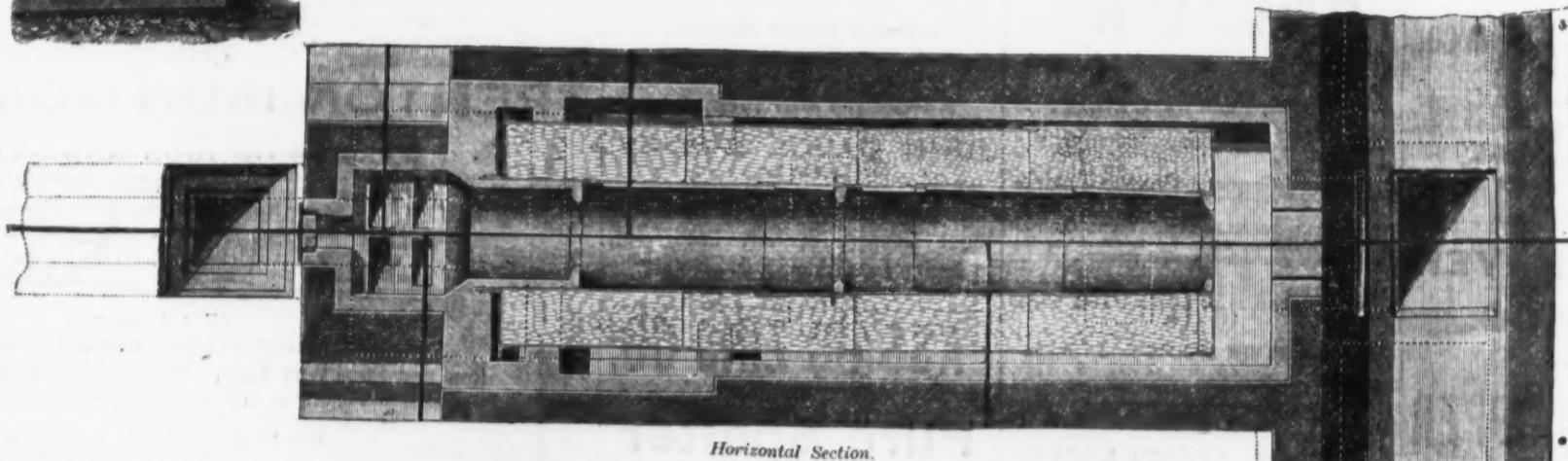
The Ohio Senate has passed the House bill providing for the piece-price convict system in the Ohio Penitentiary. One year ago a law was passed abolishing the contract system, and with eight months' experience the management came out with a deficiency of \$50,000, and the project has been, since the assembling of the present Legislature, to

The piece price plan which was adopted gives the board of managers the control of the convicts and the power to regulate the hours which they are to work, while under the old plan the contractors had absolute control of the prisoners, so far as getting all the work from them which could be wrung out. The present bill was opposed by labor organizations throughout the State with as much force as was the contract system, on the ground that the wares manufactured

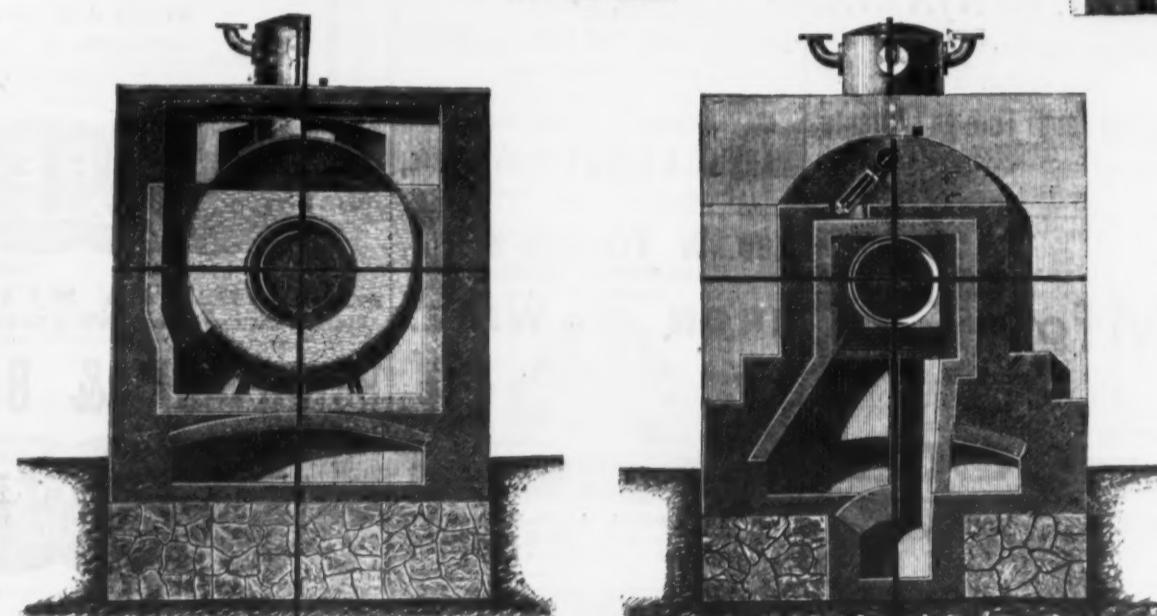
country are 71.3 times that of the London and Northwestern, and at the same rate of destruction by wear of steel rails required for replacement on all the roads of this country would be only about 438,000 net tons. The consumption of rails in 1883 in this country was about 1,400,000 tons, of which 650 miles of new road required perhaps 650,000 tons, leaving 750,000 tons for replacements both of iron and steel. It may be inferred that the destruction of



Longitudinal Section.



Horizontal Section.



Transverse Sections.

THE NEW SIEMENS SYSTEM OF GAS FIRING AS APPLIED TO BOILERS.

adopt some plan by which they could make the institution self-supporting, or as nearly so as it was under the old contract system. Many of the members were in favor of restoring the contract system and pronouncing as a failure anything which looked like reform in the management of criminals, but the advocates of reform secured enough votes to carry through the measure. The question of abolishment was made a political one in the campaign two years ago, and it is for that reason that both parties now are in favor of giving something else except the contract plan a trial, though none of them have confidence that it can be made a success. The contracts under the contract system have been expiring during the year, until now they have about 1200 convicts idle, with whom nothing can be done, and they are a heavy burden to the State.

under the piece plan would come in competition with the goods of free labor. The law, however, provides that the goods shall be used, as far as possible, in the other State institutions, and shall not be manufactured in such quantities as will make them burdensome on the market.

The durability of steel rails is discussed by Mr. Webb, of the London and Northwestern Railway, who states that, according to his calculations, 1400 pounds of steel disappear every hour from the track of that company's lines, 1780 miles in length. At first glance this seems a surprising statement, but it is only $\frac{1}{8}$ ton each hour, or 16.8 tons a day, or 6132 net tons each year, for a line of 1780 miles, having an exceptionally heavy traffic. In length the railways of this

rails by wear on the London and Northwestern is not relatively so great as it may be on many roads in this country.

The decreasing gold production of the world and the increasing consumption is giving rise to uneasiness. The decrease in production has been continuous since 1861. Taking the world's production in periods, in the five years including 1861 it was £139,000,000. In the next five years it dropped to £136,000,000, in 1871 to £128,000,000, in 1876 to £118,000,000, in 1881 to £107,000,000, and in the current five years to 1886, unless the Transvaal or some other mines add considerably to the yield, the amount will have fallen to about £85,000,000, or some £50,000,000 per five years less than was produced 25 years ago.

Thomas J. Whitman and Charles Hermann tested the Simpson compound engines at the Milwaukee Water-Works, and obtained a duty of 76,955,720 foot-pounds per 100 pounds of coal. In May, 1876, a board consisting of William E. Worthen, John C. Hoadly and Joseph P. Davis tested the compound engines built by I. P. Morris & Co., of Philadelphia, for the Lawrence (Mass.) Water-Works, and obtained a duty of 60,186,779 foot-pounds per 100 pounds of coal with one of the engines running singly, and of 98,261,700 foot-pounds for both engines running coupled; the coal per indicated horse-power per hour was found to be 1,684 pounds. The duration of the trial of the single engine was 57 hours, and of the engines running coupled 34 hours. It was found that the work done in pump was 81 per cent. of the indicated power of the steam cylinders. Subsequently, in July, 1879, Mr. R. H. Buel, connected with Park Benjamin's Scientific Expert Office, in New York City, made a trial of one of the Lawrence pumping engines, and obtained a duty of 111,548,925 foot-pounds per 100 pounds of coal, all the coal fed to the furnaces, including the wood used for starting fire, being charged to the trial. Previous to this trial, annular, rubber faced pump valves had been substituted for double-seat valves, and the efficiency of the pump was found to be 91.63 per cent. of the indicated power in the steam cylinders. The coal per indicated horse-power per hour was 1.63 pounds, and the feed-water per indicated horse-power per hour, 16.43 pounds. In October, 1878, a board consisting of Walter H. Sears and Isaac N. Scott tested the Corliss pumping engine at Pawtucket, R. I., and obtained a duty of 104,357,654 foot-pounds per 100 pounds of coal, on the total coal consumed, including the wood used to start fires (estimated at 40 per cent. its weight in coal). This trial extended over a period of two weeks, the running time being 10 hours a day. The same parties made a continuous test of 24 hours, with the same engine, and report a duty of 133,522,060 foot-pounds per 100 pounds of coal. A full description of the Pawtucket engine may be found on page 189, Vol. XXVIII, *Engineering*. The pumping engines at Lawrence were fully described in *Engineering*, Vol. XXIX, pp. 18 and 19. In April, 1877, Messrs. Moses Lane, Charles H.

(Continued on page 5.)

Economy and Duty of American Pumping Machinery.

It has been the custom in America, and particularly in the United States, to have expert duty trials, conducted by engineers of acknowledged reputation, whenever new engines were erected at prominent water works. From a number of reports of such trials, says Mr. E. D. Leavitt, Jr., of Cambridgeport, Mass., in a paper read before the Montreal meeting of the British Association, the following has been selected as of leading interest:

A Cornish engine that was tested at Jersey City, N. J., in 1857 developed a duty of 62,823,300 foot-pounds per 100 pounds of coal. In 1860 a rotative engine in Brooklyn developed a duty of 60,140,700 foot-pounds per 100 pounds of coal. For several years a duty of 60,000,000 was rarely exceeded, and it was not until 1873 that a duty approaching that recorded for the trials of the Simpson compound engines in the London Water-Works was obtained. In July of that year a board consisting of John C. Hoadly, James B. Francis and W. E. Worthen tested the Simpson compound engine, built by Henry G. Morris, of Philadelphia, at the Lowell Water Works, and obtained a duty of 93,002,272 foot-pounds per 100 pounds of coal. This trial was of 57 hours' duration. In December of the same year a board consisting of William E. Worthen, John C. Hoadly, J. P. Kirkwood, Charles Hermann and Joseph P. Davis tested the compound pumping engine at Lynn, Mass., built by I. P. Morris & Co., of Philadelphia, and obtained a duty of 103,923,215 foot-pounds for every 100 pounds of coal fed to the furnaces. This trial was of 52 hours' duration, and the experts, in making their report to the Lynn water commissioners, said:

"The duty given by your engine is, so far as we are aware, the highest that has ever been obtained by trial test of any pumping engine in this country."

In May 1875, a board consisting of William E. Worthen, Charles Hermann and Thomas J. Whitman tested the Simpson compound engines at the Milwaukee Water-Works, and obtained a duty of 76,955,720 foot-pounds per 100 pounds of coal. In May, 1876, a board consisting of William E. Worthen, John C. Hoadly and Joseph P. Davis tested the compound engines built by I. P. Morris & Co., of Philadelphia, for the Lawrence (Mass.) Water-Works, and obtained a duty of 60,186,779 foot-pounds per 100 pounds of coal with one of the engines running singly, and of 98,261,700 foot-pounds for both engines running coupled; the coal per indicated horse-power per hour was found to be 1,684 pounds. The duration of the trial of the single engine was 57 hours, and of the engines running coupled 34 hours. It was found that the work done in pump was 81 per cent. of the indicated power of the steam cylinders. Subsequently, in July, 1879, Mr. R. H. Buel, connected with Park Benjamin's Scientific Expert Office, in New York City, made a trial of one of the Lawrence pumping engines, and obtained a duty of 111,548,925 foot-pounds per 100 pounds of coal, all the coal fed to the furnaces, including the wood used for starting fire, being charged to the trial. Previous to this trial, annular, rubber faced pump valves had been substituted for double-seat valves, and the efficiency of the pump was found to be 91.63 per cent. of the indicated power in the steam cylinders. The coal per indicated horse-power per hour was 1.63 pounds, and the feed-water per indicated horse-power per hour, 16.43 pounds. In October, 1878, a board consisting of Walter H. Sears and Isaac N. Scott tested the Corliss pumping engine at Pawtucket, R. I., and obtained a duty of 104,357,654 foot-pounds per 100 pounds of coal, on the total coal consumed, including the wood used to start fires (estimated at 40 per cent. its weight in coal). This trial extended over a period of two weeks, the running time being 10 hours a day. The same parties made a continuous test of 24 hours, with the same engine, and report a duty of 133,522,060 foot-pounds per 100 pounds of coal. A full description of the Pawtucket engine may be found on page 189, Vol. XXVIII, *Engineering*. The pumping engines at Lawrence were fully described in *Engineering*, Vol. XXIX, pp. 18 and 19. In April, 1877, Messrs. Moses Lane, Charles H.

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(Continued from page 1.)

Haswell and Henry Warrington tested the Simpson compound engines at the West-Side Water Works, Chicago, built by the Quintard Iron Works, of New York, and obtained a duty of 96,668,800 foot pounds per 100 pounds of coal.

In May, 1882, Mr. Samuel M. Gray, city engineer of Providence, made a six days' test of the Corliss engines at the Pottaconsett Water-Works, in Providence, and obtained a duty of 113,271,000 foot-pounds per 100 pounds of coal, reckoned on the coal consumed, including the wood used in starting fires (estimated at 40 per cent. its weight in coal). The average running time for the six days was 12 hours 27 1/2 minutes. Deducting the coal used for starting and banking fires, Mr. Gray estimated the duty at 138,035,000 foot-pounds per 100 pounds of coal consumed in running time.

In June, 1883, Mr. Chas. T. Porter made a test of the Gaskill compound pumping engine, at Saratoga Springs, N. Y. This test was of 68 hours' duration, and the duty was reported at 106,838,000 foot-pounds for each 100 pounds of coal consumed during the trial. Mr. Porter also reports that for the first 20 hours the apparent duty was 117,580,000 foot-pounds, and for the first 12 hours an apparent duty of 127,170,000 foot-pounds. These results have been seriously questioned by many eminent engineers, on the ground that the conditions obtaining would render so high a duty impracticable. The writer, while possessing the utmost confidence in Mr. Porter's ability and integrity, cannot but feel that there is a mistake somewhere, as the performance too far exceeds that of any test reported, made under similar conditions.

It may not be amiss, in concluding this paper, to sketch rapidly the leading improvements made in pumping machinery during the past 40 years, and to summarize the characteristics of the best. The most important improvement in heavy steam pumping machinery has been in compounding, which has conducted to both economy of fuel and smoothness of action, and has reduced to a very great extent wear and tear. In the pumps, the substitution of multiple valves for the enormous clacks and double, treble or four beat valves, formerly used, has proved of very great advantage. Improvement in design in the direction of making the parts of greater strength and massiveness, as well as more accessible for examination and repair, has been decided. Automatic valve gears, controlled by a governor, are now largely adopted. High-pressure steam and high grades of expansion came in, as a matter of course, with compounding. Mr. Corliss, in his practice, has reached from 125 to 130 pounds boiler pressure, expanded 20 times, while in the new Louisville engine it is proposed to work under 140 to 150 pounds. By far the most important improvement has been in the introduction of direct-acting steam pumps, either simple or compound. They are an established article of manufacture, kept in stock, and made with interchangeable parts, to standard jigs and templates. Their economy of first cost and portability strongly commend them for general use.

For small water-works, and for large works where the cost of fuel is not too great, the compound Worthington duplex engine possesses very great advantages, owing to its small first cost and good average running economy. Including foundations and structures, these engines cost less than half that of first-class compound beam and fly-wheel engines of equal capacity. In fact, at the Boston sewage-works, their cost, as estimated by the writer, does not exceed 40 per cent., and with cheap coal the saving by the high-duty fly-wheel engine will barely pay interest on its extra cost. At the Lowell Water-Works there is a Simpson compound engine, which would probably cost \$75,000 to duplicate at the present time. By its side stands a Worthington duplex, whose cost at present prices would not exceed \$25,000. The duty of the Simpson engine for 1883, on the total coal consumed, was in round numbers 78,000,000, and of the duplex engine 61,000,000. The Worthington engine would have required 198 tons more coal to have done the work actually credited to the compound fly-wheel engine, which would cost, at \$5 per ton, \$990, which is 1.9 per cent. interest on the \$50,000 extra cost of the fly-wheel engine. It is fair to state that the beam and fly-wheel engine was not working up to its full capacity, though rather above one-half the same. Doubling the work done would require 396 tons more coal—worth \$1980—for the duplex engine, which is equal to about 3.8 per cent. on the extra cost of the fly-wheel engine.

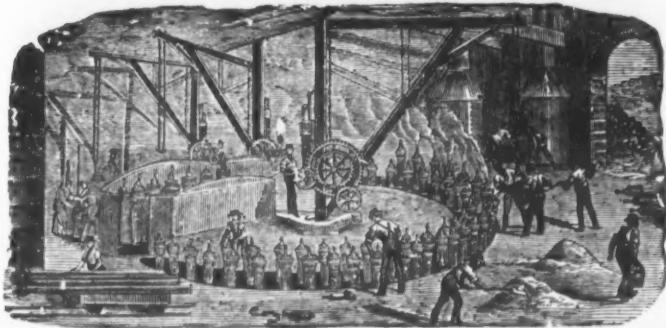
A more important comparison is afforded by the West Side Water-Works, at Chicago, which have cost, including machinery, buildings and foundations, not far from \$650,000. A duplex plant of the same capacity could easily be supplied complete for \$300,000. The cost of fuel per 1,000,000 gallons pumped at the West Side Works in 1882 was \$1.90, the amount pumped being 10,000,000,000 gallons, with two engines. The four engines can pump 20,000,000,000 gallons, which, at \$1.90 per million, would cost, \$38,000. To pump this quantity of water with duplex engines would require not exceeding one-third more fuel, costing \$12,667.67, which is equal to 3.62 per cent. interest on extra actual cost of the plant in use. In the selection of cases for comparison plants which are acknowledged to be first-class have been chosen.

From what has been said it will be seen that "high duty" may cost too much. Its value must be predicated on the saving of fuel, as balanced by the interest and depreciation account of the extra expenditure for plant. If the saving tips the scale high duty is a good investment; otherwise not. The most successful examples of high-duty pumping engines, commercially considered, that have come under the writer's notice are those at Pawtucket and Providence, R. I., and Lynn, Mass., in all of which instances comparatively small engines of moderate first cost are made to do a large amount of work by means of high-pressure steam and high piston speed. The key to established success seems to be the adoption of these two adjuncts of economy.

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PITTSBURGH, PA.

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

STEEL,

Warranted Equal to any Produced.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives, Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Muley, Mill, Gang, Drag, Pit and Cross-Cut Saws.

Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws.

Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire-Boxes, Smoke-Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequaled for surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c., &c.

Cast and German Spring and Plow Steel.

"Iron Center" Cast Plow Steel.

"Soft Steel Center" Cast Plow Steel.

"Solid Soft Center" Cast Plow Steel.

Finished Rolling Plow Coulters, with Patent Screw Hub Agricultural Steel cut to any pattern desired. [attached. Steel Forgings made to order.

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THE MIDVALE STEEL COMPANY, CRUCIBLE AND OPEN-HEARTH STEEL.

TIRES and AXLES OF EVERY DESCRIPTION.



Tool, Machinery and Spring Steel
Castings and Forgings.

WORKS AND MAIN OFFICE,
Nicetown, Philadelphia, Pa.

BRANCH OFFICE,
333 Walnut St., Philadelphia, Pa.

"THE FRANKFORD STEEL WORKS,

STEEL FORGINGS,

NONPAREIL TOOL STEEL,

MACHINERY STEEL.

FRANKFORD, PHILADELPHIA, PA."

Light Steel Rails,

40 lbs., 35 lbs., 30 lbs., 25 lbs., 20 lbs. and 16 lbs. per yard.

APPROVED PATTERNS,

For Mine, Lumber and Narrow-Gauge Railroads.

ALSO SPLICE PLATES, SPIKES, SWITCHES, FROGS, &c., &c.

PENNSYLVANIA STEEL CO.

The SKATE can turn in
a 25-inch Circle with
all four of the Wheels
on the Floor.

No Cutting or Wearing of
the Elastic Spring.

Liberal Terms to the Trade.

Please name this Paper.



The Latest and Best in the World.

For EASY running and
best MOTION it has no
EQUAL.

It is the LIGHTEST Skate
in the MARKET.

THE TENSION CAN BE
CHANGED to suit the weight
of the user in a moment. It
is practically and mechan-
ically complete.

For further particulars, address the
Northwestern Hardware Co., Sole Agents.

92 LAKE STREET, CHICAGO, ILL.
101 READE STREET, NEW YORK.

On exhibition at Indiana Dept. Government Building, World's Exposition, New Orleans, La.

Established - - - 1861.

THOMAS C. BURROWS,

Agent for Jersey City Steel Company,

STEEL

Of All Descriptions.

WAREHOUSE, 99 and 101 JOHN ST., NEW YORK.

CALUMET IRON & STEEL CO.,

MANUFACTURERS OF

OPEN HEARTH STEEL, PIG METAL,

MERCHANT BAR, IRON AND NAILS,

SIEMENS OPEN HEARTH STEEL CASTINGS FOR
RAILROAD, MACHINERY AND AGRICUL-
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STANDARD STEEL CASTING CO.,

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Open Hearth and Crucible

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QUALITY EQUAL TO STEEL FORGINGS

Can be Bent, Welded or Forged.

STEEL INGOTS, Best Stock, Furnished to Order.

Ship Patterns direct to Thurlow, Pa., via. P. W. & B. R. R., or via. P. & R. R. R.

We are prepared to make all kinds of Heavy or Medium Weight

STEEL CASTINGS

FROM

OPEN HEARTH METAL.

We wish to give special attention to making Cast Steel Rolls of all sizes, Mill Gearing wherever Cast Steel is suitable. Also Cranks, Cross Heads, Shafts, &c., for Steam and Blowing Engine construction.

Being desirous of securing a share of public patronage, we will endeavor to make our product equal in quality to any in the market.

MACKINTOSH, HEMPHILL & CO., Limited,

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Lawrence Curry Comb Co.,

309 EAST 22d ST., NEW YORK.

Our line of perfect Combs is so well known it needs no comment. Our Elevated Back Comb (please notice the cut), all improvements, and will be sold at prices that do not reflect. We also call your attention to our line of Monkey Wrenches. The improvements over other wrenches are the brace from head to handle, which is made of one piece of ferrule, which is reinforced main bar and head specially; at per cent. greater strength than any Wrench manufactured. We have just completed our entirely new and Diving Machine in addition to our regular line. Send for Catalogue and Prices.

LAWRENCE CURRY COMB CO., 309 E. 22d St., New York City.

PATENTED NOV. 2d, 1880.

STEEL FORGED, CASE HARDENED AND HIGHLY POLISHED.

THE

Diamond Wrench

Is the BEST WRENCH ever offered for
MECHANICS, FARMERS and GENERAL USE

Reasons Why.—It is forged from solid Steel, Case Hardened, finely fitted and highly polished. It adjusts more rapidly and accurately. It gives the grip of a vice. Therefore it never slips to the injury of the hands of the Operator, Nut, Wrench or surrounding machinery. The jaws are perfect parallel lines. It can be applied or fastened to the corners as well as to the face of the nut. This allows giving the eighth turn in corners or difficult places, the same as ordinary wrenches or octagon wrenches. In removing nuts from carriages, the wrench is set tightly upon the nut, and the hands are not required to be in contact with the black oil. It is a complete hand vice for holding all articles within its capacity. It is in using the Diamond End, it holds the nut without setting up the thumb-screw. For sale by all Hardware Dealers throughout the United States. Manufactured by

DIAMOND WRENCH MFG. CO., Portland, Me.



COLLIAU PATENT FOUNDRY CUPOLA,

Made in six sizes, with capacity from one to fifteen tons per hour.

Adapted to all classes of work, for light or heavy castings, and excels all others in ECONOMY OF FUEL AND IRON. Address

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Write for estimates and mention this paper

BURGESS STEEL & IRON W'KS

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CRUCIBLE AND OPEN-HEARTH STEEL,

Hot Polished Shafting,

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IRON and STEEL Boiler Plate, Tool, Lay Steel and
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Oil Well Tubing, Casing and
LINE PIPE.

Cotton Presses, Forgings,
Rolling Mill and General
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READING IRON WORKS,

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FRANKLIN S. MILES,
Manufacturer of
Brass, Iron, Steel and German Silver
SCREWS.

205 Quay St., Philadelphia.

The Common Sense Sash Holder and Lock Combined.

PATENTED MARCH 6th, 1883.



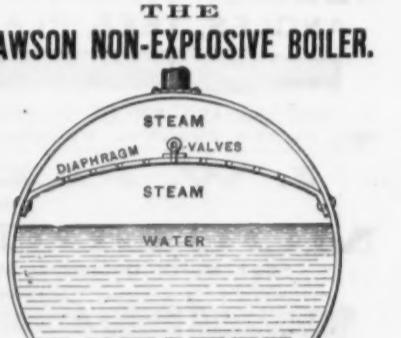
In the best, cheapest and most complete Sash Holder and Lock in the market, and we shall have the largest sale. It holds the window at any point, and locks the same when down, and entirely prevents windows from rattling.

I am the sole owner of this patent, and sole manufacturer of these fasteners, and all persons are hereby notified of this fact. Any parties in interest will be dealt with according to law.

Parties who have been buying and selling "Practical Fastener," so-called, will do well to heed the warning. Orders from the trade respectfully solicited.

Circular with price list mailed on application.

H. A. WILLES,
MANUFACTURER AND DEALER IN HARDWARE
SPECIALTIES AND OIL AND GAS STOVES,
727 Market Street, PHILADELPHIA, PA.



This is the only steam boiler ever devised in strict compliance with the demands of natural laws. It gives complete immunity against explosions, delivers dry steam, prevents all incrustation and deposit on the bottom plates, is more safe with high pressure, and is more economical. The invention is applicable to every style of boiler, and can be readily applied, internally or externally, to new or old boilers. Licenses granted on liberal terms to manufacturers. Send for description.

LAWSON NON-EXPLOSIVE BOILER CO.,
155 and 157 Broadway, New York.

CARRIAGE HARDWARE.

LARGEST LINE OF
WROUGHT CARRIAGE FORGINGS

MADE BY ANY HOUSE.

Send for Catalogue and Discount Sheet.

The E. D. CLAPP MFG. CO.,
AUBURN, N. Y.



February 26, 1885.

7

THE IRON AGE.

SILVER & DEMING MFG. CO.,

SALEM, OHIO, U. S. A.,

MANUFACTURERS OF

Cistern, Pitcher, Well
and Force Pumps,
Wind Mill Pumps,

HAND AND POWER

ROTARY PUMPS,

Hydraulic Pumps,

BOILER FEED PUMPS,

Garden Engines, &c.

Also, Carriage Makers' Tools,

Blacksmiths' Drills, Butchers'

Tools, and Feed Cutters.

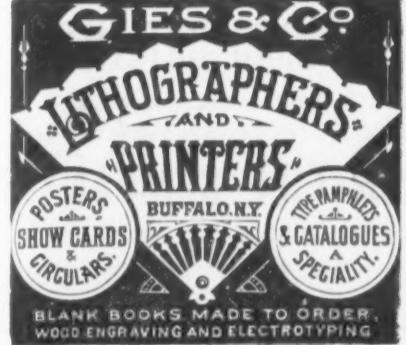
Write for Catalogue and Prices.

ENGLISH BROS., Kansas City, Mo.

GENERAL WESTERN AGENTS.

European Agency with SELIG, SONNENTHAL & CO.,

London, E. C., England.



JOHN MAXWELL,

Manufacturer of

Patented

BRASS, BRIGHT
TINNED WIRE
& JAPANNED

Bird Cages.

The cheapest and most
available in market.
Catalogues and Price
Lists furnished to the
trade.

247 & 249 Pearl St.,

New York.

Full size of Band for Brass and Tinned Wire Cages.

DETROIT BLOCK
WORKS,

Detroit, Mich.

MANUFACTURERS OF
EVERY VARIETY OF

Tackle Blocks

AGENTS:

JOHN H. GRAHAM & CO., New
York.
O. S. CHAMBERLAIN, Chicago.
ST. LOUIS RY SUPPLIES MFG
CO., St. Louis.

OVERHEAD RAILWAY,

With Switches and Turntables,

THE

HARRINGTON HOISTS,
Wythe ELEVATORS,
WITH AUTOMATIC STOP.

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12 Cortlandt Street,

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PATENTS

AND PATENT SUITS.

Please send for Circular to
THOMAS D. STETSON,
28 Murray St., New York.Samuel Martin,
MANUFACTURER OF
Theatrical Hardware,
187 Eighth Avenue, NEW YORK.W. & B. DOUGLAS,
MIDDLETOWN, CONN.

The Oldest and Most Extensive Manufacturers of

PUMPS, HYDRAULIC RAMS, GARDEN ENGINES,
Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill
Pumps and other Hydraulic Machines in the World.

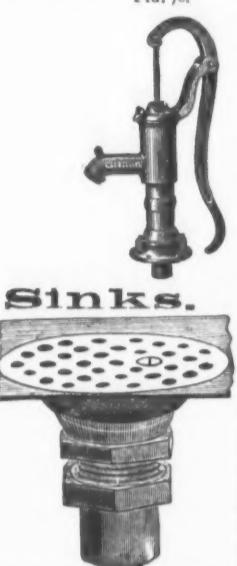
FIG. 120.



FIG. 209.

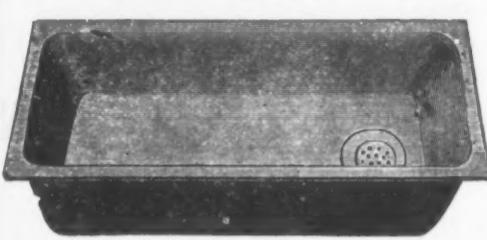


FIG. 70.



Wrought Steel

Sinks.



One of the strong points of these sinks is the new coupling with which they are now supplied and which is pronounced by all plumbers the best on the market. It is used with both lead and wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping out the pipe. The strainer and all parts of the coupling are turned, and are furnished with all sinks with the exception of the drain.

The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses which have been interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent, is saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada, Europe and Australia.

BRANCH WAREHOUSES.

85 and 87 JOHN STREET, NEW YORK, and 197 LAKE STREET, CHICAGO, ILL.

UNION MANUFACTURING CO.

Manufacturers of

SKINNER'S PATENT
COMBINATION CHUCK.

Plain and Ornamental Butts,
Single and Double Acting Spring Hinges,
Union Coil Door Springs,
Galvanized Pump Chain,
Patent Rubber Buckets,
Wooden Well Curbs, Wood Tubing,
Iron and Brass Pumps,
Patent Copper Pumps,
Hydraulic Rams, Power Pumps,
&c., &c., &c.

Hand Force Pump.

It is made of brass, is strong and light, and is the best pump of its kind in the market. Write for prices.

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Warehouse, 96 Chambers St., New York. NEW BRITAIN, CONN.

GEORGE BROOKE, President.

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THE E. & G. BROOKE IRON CO.,
BIRDSBORO, BERKS CO., PA.,

MANUFACTURERS OF

ANCHOR NAILS AND SPIKES. BRAND

Capacity, 1000 Kegs per Day.

Made from their own Pig Iron, insuring Regularity and Superiority in Quality.

ALSO

FOUNDRY AND FORGE PIG IRON,
AND COLD BLAST CHARCOAL CAR WHEEL IRON.OLD DOMINION
CUT NAILS, BAR IRON.

Address R. E. BLANKENSHIP,

RICHMOND, VA.

IRON AND STEEL DROP FORGINGS

All shapes, small and large, including

GUN, PISTOL, WRENCH BARS, &c. ALSO, DIE SINKING. MANUFACTURERS ALSO
OF BRICKLAYERS', MOULDERS' AND PLASTERERS' TOOLS,
SADDLERS' ROUND AND HEAD KNIVES.

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36th & Filbert Sts., WEST PHILADELPHIA.

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THOMAS DEVLIN & CO.,

MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to
order. Special attention given to Tinning, Bronzing, Coppering, Japanning and Fitting. A large line of
Carriage and Wagon Castings constantly on hand for the trade.

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Manufacturers of

SEAMLESS DRAWN BRASS & COPPER TUBES,

CUT NAILS, HORSE NAILS, FORGINGS, &c.

NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.

NEW PUBLICATIONS.

THE DISTRIBUTION OF PRODUCTS, OR THE MECHANISM
AND THE METAPHYSICS OF EXCHANGE. By Edward
Atkinson. Size 8 x 5 1/2 inches, 303 pages. Price, \$1.25.

This treatise comprises three separate essays, as follows: "What Makes the Rate of Wages?" "What is Bank?" and "The Railway, the Farmer and the Public." The first, which is by far the most extensive, covering nearly 200 pages, is a reprint of the address delivered by Mr. Atkinson before the British Association for the Advancement of Science, at Montreal, last August, to which is added a number of notes and appendices, the latter being of a statistical character. The remaining two essays are also reprints of previous writings. Mr. Atkinson's answer to the question, What makes the rate of wages? will be sufficiently explained if we refer to a statement made many years ago by the French economist Bastiat, which the author makes the text of his argument in proving that wages increase with efficiency of labor. Bastiat contends that in proportion to the increase of capital the absolute share of the total product falling to the capitalist is augmented, but his relative share is diminished; while, on the contrary, the share of the laborer is increased both absolutely and relatively. Mr. Atkinson's position is upheld by citing the rate of wages paid to labor at different times and in different countries. As would naturally be supposed, considering the field of Mr. Atkinson's especial labors, the cotton manufacturing industry is the one drawn on for facts and figures. His argument may be briefly summarized as follows: The rate of wages paid in the cotton mills of Great Britain and the New England States has been steadily rising since their establishment in the early part of this century, notwithstanding the increasing competition and introduction of improved machinery, which have lowered the price of cotton goods to hardly more than a fraction of former figures. For the same object the wages of the hand weaver of South Carolina and the mill operative of Massachusetts are compared, as is also the latter with the Asiatic laborer. The result of it all is to show that the cheapest labor is not the lowest priced, and that a reduction in the price of the product does not lessen the wages paid to labor, but in reality increases them. It is to be regretted that Mr. Atkinson did not deal with other industries besides cotton manufacturing, as his conclusions then would not have been subject to the criticism of insufficient data. In one of his generalizations the author states that because of their immense standing armies the Continental States cannot long compete with England or America. The burden of these armies has, however, existed for some years in France and Germany, and France still manufactures silk, while England has abandoned the industry and sent many of her operatives to seek a living in the protected silk mills of this country. Germany, also, has not lessened her production of iron and steel or woolens, and, in fact, with the former successfully competes in the English markets, and annually ships large quantities of woolen goods to this country. May it not be that a wise system of tariff laws has aided somewhat in effecting this result, in spite of the incubus of the standing armies? The essay on banks and banking is a lecture delivered a few years ago before the Finance Club of Harvard University, and, as the title suggests, is an elementary treatise on these institutions and the work they perform. The third essay is largely statistical, and deals with the present state of affairs from a commercial standpoint. The comparisons are both interesting and instructive, and will repay careful study, as, with the facts and figures given, they serve as valuable data in an analysis of the industrial situation in this country.

REPORT OF THE NEW YORK STATE SURVEY FOR
THE YEAR 1884. Size, 9 x 6 inches, 54 pages,
pamphlet edition. State Survey Office, Albany.

The report proper by the director, Mr. James T. Gardiner, covers but a few pages, the major part of the pamphlet being occupied by tables compiled from previous surveys. Though the report of the director is brief, it is so by necessity, and the reasons for its brevity should merit the attention of all who are interested in an accurate and complete survey of the State. The obstacle in the way of the proper execution of this public work is the meagreness of the annual appropriation, which has so limited the powers of the director that he has been unable to continue the field-work of the survey. The report is a very earnest appeal for a more adequate appropriation in the future, and, considering the excellence and value of the work done in the past, it is much to be regretted that the financial condition of the department is not favorable to its really efficient continuance.

Wire Rope for Heavy Cranes.—An overhead traveling crane at the works of Messrs. Haniel & Lueg, of Grafenbergen, near Düsseldorf, capable of lifting with double gearing up to 15 tons, gave considerable trouble from frequent breakage of the lifting chain, which was mainly due to its being wound double upon the drum, which had been chosen of too small a diameter. The danger and expense arising from these breakages necessitated an alteration, and after lengthy consideration it was decided to try wire rope, although no precedent for its application to anything like such heavy loads could be found. The rope chosen to replace the 1 1/2 inch chain was made of 373 steel wires of 1 millimeter diameter, and has a tensile strength of 76 tons per square inch. The rope has an outside diameter of 1 1/2 inches, and a total breaking strain of 146 tons, or nearly ten times its working strain. While previously, with the chain, the load was carried on a single pulley by a double chain, with the rope an additional pulley has been added, suspending the weight on four ropes; and to partly compensate for the reduced speed of lifting, the diameter of the rope drum has been increased from 17 1/4 inches to 22 1/8 inches. The rope now finds ample room on the drum, and has, during more than nine months, with an average working time of 16 hours per day, given every satisfaction.

Country Labor in English Towns.—The London *Times* makes the following observations on an evil existing in England, which are to a remarkable extent true for this country: "There is trade depression, we know, but it has been felt more by the employers than by the laboring class. With more justice has the complaint been made that men from the country are crowding into our towns, and that they can find nothing to do on their arrival. The surprise is that they can expect anything else. They are in search of what they are not fitted for, and which would be of little service to them if they could get it. A countryman does not bring with him the kind of skill which town employers demand. He can go to work for which no special training is needed, and as there is seldom a superfluity of this he must expect to be out of work during a large part of his time. His case is a hard one, but it is one for which Mr. Henry George can propose no cure. To set a starving man down on an acre of land and to bid him

The two pulleys over which it works are 17 1/4 inches in diameter. The rope was made by Messrs. Fulton & Guilleaume, of Muelheim, and was galvanized to protect it against the weather. It cost was one-half of that of the chain previously used.

Breakage of Rolls in Sheet-Iron Mills.

The very considerable expense or loss caused the owners of rolling mills by reason of the frequent breakage of rolls has induced many mill managers to carefully consider the problem for the purpose of ascertaining the cause of breakages and reducing the liability to fracture to the minimum. It would appear that much of the difficulty arises from incompetency or carelessness on the part of the workmen, and accordingly such efforts as are made to instruct them are likely to prove beneficial. In the mill of the Volta Iron Company, Limited, at Apollo, Pa., several breakages have occurred recently, and, while the general percentage of fractures perhaps is no greater in this concern than is ordinarily experienced in sheet-iron mills, several of the breakages have been of a character which, in the estimation of the managers, might have been avoided by due attention to simple principles upon the part of the workmen. In an effort to remedy this difficulty and to avoid future accidents, a printed circular has been recently prepared by Mr. James Mallen, the manager of the mills referred to, and is prominently posted in the works. It is entitled, "Causes of Breakage, and How to Guard Against the Same." In the course of the circular the following directions appear:

"In starting the mill in cold weather, see that the first is out of the rolls before commencing to work on them; then see if the mill is in line with the balance of the train; if it is not in line stop until it is made right. In warming up the mill do not hurry, but allow time for the heat to penetrate the rolls. When the rolls are in shape for wide iron, commence on it, and, if from any cause the mill should stop, charge in the pair furnace some narrow iron; get it thoroughly heated and notice in what shape the rolls are before again commencing on wide iron. Be sure at all times to see that the pair heater has the iron heated thoroughly, and under no circumstances put a piece in the rolls that is not thoroughly heated. At the doubling of pairs on finishing rolls is the time when most rolls are broken; accordingly at this point the screws should be well slackened, in order to give only a slight pressure on the iron. If from any cause the pieces should become chilled, return them to the furnace before doubling. The time when pair heaters should be most careful about heating is after the changing of turns, or when they clean the fires. The iron is apt to have a wash heat at that time—that is, hot on the outside, but cold in the middle."

It is the belief of Mr. Mallen that careful attention to these simple directions upon the part of the rollers will have the effect of greatly reducing the number of breakages which occur.

Contracts of Married Women.

Considerable doubt is frequently entertained and expressed as to the validity of contracts of married women, and there is a vague feeling that it is not perfectly safe to enter into such contracts. This uncertainty arises from the former laws in regard to *femmes covert*, as they were termed, by which it was laid down that their existence was merged in that of their husbands, and that they could make no contracts except through him. In other words, husband and wife were one and the husband was that one. In view of the large number of married women who do business on their own account, and the number is constantly increasing, the matter becomes very important. To remove any uneasiness, it may be stated that within the last 30 years laws have been passed in all the States by which married women who engage in trade and carry on a separate business are bound by their contracts in relation to that business as much as a man or as if they were unmarried.

In some contracts they make their husbands also bound. There are contracts for necessities, including dress, groceries, &c., for household use. This is so, even if the wife lives apart from her husband or if he refuses to support her and pay the bills, provided, of course, that they are not divorced. Her husband is bound to support her, and no notice in newspaper or in any other way to the effect that he refuses to be bound by her contracts can relieve him from this liability. The tradesman is perfectly safe, if the husband has property, in giving her credit under these circumstances, even if he knows the facts. He can collect the money either of her or of her husband. It is always better, in case of a note or draft given by a married woman, or any contract, in fact, made by her, to use some form of words such as these: "I hereby charge my separate estate for the payment of this note," &c. This used to be necessary in New York, but a statute of 1884 renders it non-essential now. It is expedient, however, for the purpose of avoiding doubt, to still employ the form.

Country Labor in English Towns.—The London *Times* makes the following observations on an evil existing in England, which are to a remarkable extent true for this country: "There is trade depression, we know, but it has been felt more by the employers than by the laboring class. With more justice has the complaint been made that men from the country are crowding into our towns, and that they can find nothing to do on their arrival. The surprise is that they can expect anything else. They are in search of what they are not fitted for, and which would be of little service to them if they could get it. A countryman does not bring with him the kind of skill which town employers demand. He can go to work for which no special training is needed, and as there is seldom a superfluity of this he must expect to be out of work during a large part of his time.



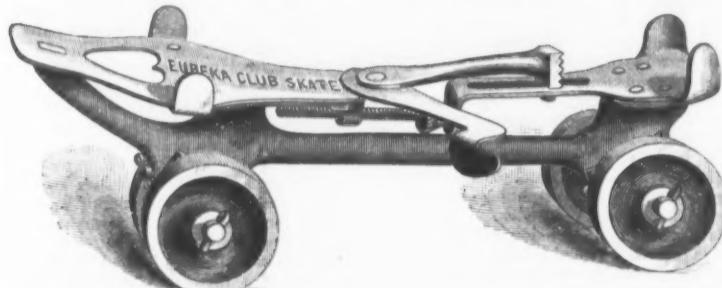
McCAFFREY & BRO.,
PENNSYLVANIA FILE WORKS
Philadelphia, Pa., U. S.



Manufacture and keep in stock a full line of FILES and RASPS only for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

"EUREKA" CLUB ROLLER SKATE.



The above cut represents the "EUREKA" Roller Skate, the **Most Complete and Most Perfect** in the Market. The clamp and foot-plates are made of Steel. **Simple, Durable and Easily Adjusted.**

When fastening this Skate to the shoe, the heel-clamps are stationary. The toe clamps are drawn together, and the corrugated bar pressed back against the heel simultaneously by one motion of the lever, which is under the instep and cannot by any possibility be thrown out of position while skating, making a most perfect and secure adjustment to the shoe.

LIST, \$7.00. SPECIAL DISCOUNT TO THE TRADE.

MANUFACTURED BY P. LOWENTRAUT.

ADDRESS

JOHN H. GRAHAM & CO.,

General Agents,

118 Chambers St., New York City.

LIGHTNING HAY KNIVES. WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO., East Wilton, Franklin Co., Maine.

For sale by the Hardware trade generally.

CAUTION:

We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth, for an improved Hay knife.

The characteristic feature of the invention is a curved blade, provided with a sharp cutting edge, and with suitable working handles. It is our purpose to prosecute all infringers of our patent, and we have already commenced one suit, which is nearly ready for hearing, and are about commencing suits against other parties.

All manufacturers are hereby warned of our rights, and the public are cautioned against purchasing any Hay "Saw Knives" which are not of our genuine manufacture.

HIRAM HOLT & CO.

EAST WILTON, May 26, 1884.

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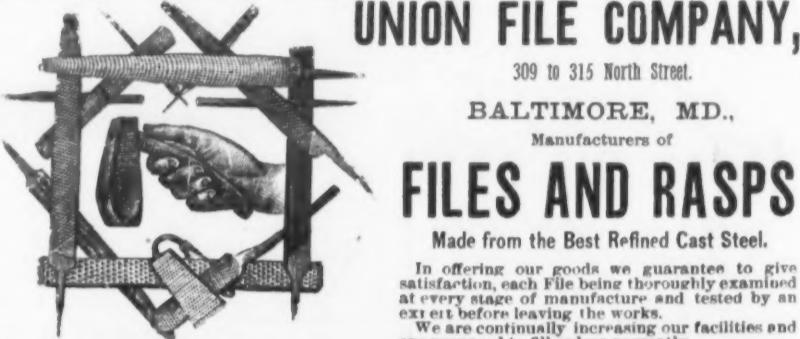


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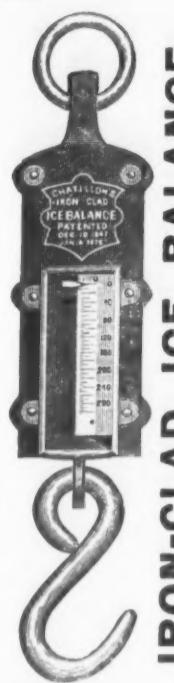
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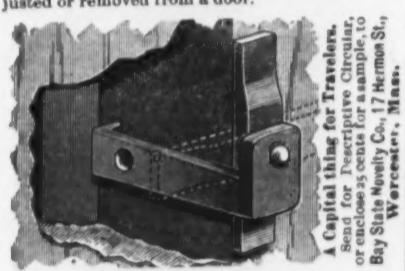
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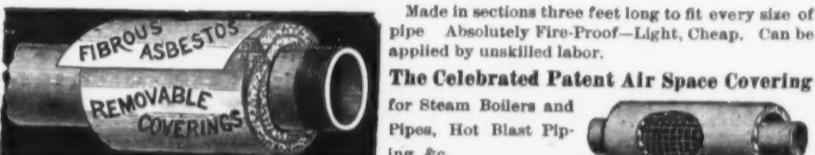
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cultivate it and live upon it would be sheer mockery. The redivision of goods must go a good deal further before his land could become of use to him, and he would be a great deal worse off under the new system than he is now, even at starvation wages, for he would have no chance even of these."

English Letter.

(From Our Regular Correspondent.)

LONDON, February 9, 1885.

THE WEEK

has been a quiet one, and it has presented no commercial or industrial developments of importance. As I remark lower down, everything is dull and lethargic, and there are really few features wherewith to furnish an interesting letter for your readers. The saddest news of the week has been the intelligence that poor Sidney Gilchrist Thomas died in Paris, on Sunday, February 1. We who knew him intimately were only too well aware that the end must come, but even that knowledge of the inevitable did not prevent the fatal news from shocking all to whom it came. You, who also knew him personally, would also be shocked, I have no doubt. He died in his 35th year—he would have been 35 in a few months—so that he has literally been cut off in the very prime of life, just at an epoch when most men are busiest, and when the skill and industry of the earlier period of life is, or ought to be, bearing fruit. In one sense poor Thomas was older than his years, and those who scanned his thoughtful, dreamy face might well have believed him much older than he really was. I need not attempt to give you any details of his biography, for you will be able to obtain an abundance of such particulars from other sources, but I may, I hope, place on record my sense of the great loss metallurgical science has sustained by his death. Like Bessemer, his great prototype, Thomas was essentially an inventor. He virtually gave his life to dephosphorization, yet he never desisted from investigating, and even when ill last winter, in Algeria, he was in constant communication with the Patent Office here, and carried on experiments on the northern shore of Africa as philosophically as in London. One invention he had pushed very forward, and I am told that it had been tried with success here for six months. I am not at liberty to state its nature more specifically, but I am told that under its operation what is now esteemed a principal production would have been merely a by-product. Perhaps this invention will now be carried on by somebody else. Thomas always acted as his own patent agent—that is to say, he drew up his own specifications and had them revised by a qualified person. The leader of the bar in patent cases had a perpetual retainer from him—a proof of considerable foresight. In Germany, on one occasion, he appeared in court in person, argued and won his case. His sister was his amanuensis, and she, with his mother, was with him to the last. He had often expressed a wish to be buried in or near Paris, and he was interred, therefore, on Tuesday, February 3, in the cemetery at Passy, a pleasant suburb of the French capital. I don't think Thomas ever made a personal enemy; if so, certainly I never heard of it.

THE IRON MARKET

has not improved since the writing of my last report; indeed, the stagnation of business in general is so marked that there are very few features in any branch of the iron trade worthy of special note. The keenness of competition has not been diminished, but rather intensified in some departments, owing to the relative scarcity of orders, aided by the efforts which are being made by some of the stronger concerns to crush their weaker rivals out of existence. In times such as these the weight of capital must tell in the long run, and the advantages conferred thereby are all the more readily reaped if there are also manufacturing advantages or special facilities for effecting foreign and coastwise shipments. The race, in fact, is no longer a question of speed, but of endurance, and the struggle is so determined that there can be little doubt that a much longer continuance of the depression will bring about further withdrawals, and so lead to a diminished production. Whether in all cases this result would be beneficial would not be seen at once; but it is probable that in some cases the wiser way would be to enter into a mutual arrangement for the protection of the particular industry concerned. In the galvanized-iron trade, for instance, the prime cause of the present disorganized state of affairs is understood to be the rivalry between the two large houses. These concerns are said to be cutting prices severely in order to secure business, all the other houses in the trade alleging that they would be willing to enter into an arrangement for establishing a minimum price, and, if deemed advisable, for limiting the output. At present any such combination appears to be a remote contingency, and that will be the case until the two houses in question have grown tired of the struggle in which they are now so actively engaged.

At Glasgow the week has been a quiet one, and only a limited amount of business has been done in warrants, despite the lower values, which closed at 41 3/4 £ per ton. Scotch makers' brands are nominally unchanged, but in some cases are 3d. @ 6d. £ per ton easier on the week. Shipments continue poor, and stocks are very large, so that the outlook is not bright. At Middlesbrough the market for pig iron has remained dull, with No. 3 at 35/ @ 35/3 in makers' hands, but with rumors of sales by merchants at 34/9 @ 35/ £ per ton. The official returns for the month of January are not likely to strengthen values, inasmuch as they show that stocks increased by 32,000 tons. Foreign shipments are in arrears, but a good deal of iron is being sent to Scotland, thereby keeping the returns in that respect fairly up to the mark. Up to the present the final decision of the ironmasters of the Cleveland district on the subject of restriction has not transpired, but it is believed that an additional number of furnaces will be suspended. The present arrangement, it will be remem-

bered, expires at the end of February. On the West Coast hematites are a shade easier, but the nominal quotation for mixed lots in usual proportions is still about 44/ £ per ton. Sales are on a moderate scale, but do not absorb the entire production. In the other smelting districts affairs are very quiet, the quotations of a few weeks ago being "shaded" in order to effect sales. Heavy finished iron is no better in respect of ship plates, but at two or three of the large works in Derbyshire, Staffordshire, &c., there is a good deal of bridgework and other structural iron in hand. Galvanized iron is demoralized, and some of the makers are pressing hard for orders, which are difficult to obtain, many of the merchants having supplied themselves for some time ahead. Fencing wire is dull and neglected, but some other kinds of wire are in fair request. Ordinary finished iron is still quiet, although there are better inquiries in some quarters for bars. Quotations are so irregular that they afford no real criterion of actual figures. Marked bars, however, are £7 @ £7. 10/; medium, £6 @ £6. 10/; fair ordinary, £5. 12/6 @ £6; common, £5. 5/ @ £5. 10/; and ordinary Welsh, £4. 15/ @ £5. 10/ ton. For sheets there is a fair inquiry, mostly for working-up sorts. Hoops, angles and strips are in moderate request only. Old materials are neglected at about the following rates, which are quoted by F. Pitts & Co., London: Old D. H. iron rails, £2. 15/; No. 1 heavy wrought scrap, £2. 2/6; old boiler tubes, £2. 7/6, and old cast iron, £2 @ £2. 2/7 ton, all f.o.b. London or other good British port, net cash.

Freights are nominal to the States both from Glasgow and Liverpool, while from London, Cardiff, &c., they are irregular and low. With reference to the British Channel ports Edwards, Robertson & Co., Cardiff, advise me: "The exports from this channel to the United States and Canada during the month of January have been nearly confined to tin plates, of which comparatively a fair quantity has gone forward for the first month in the year. The low rates of freight current during the latter part of the past year still continue, and tonnage is easily obtainable at 7/6 @ 8/." Steel is without change to note, but there is still only a limited amount of employment at many of the Sheffield works. Elsewhere the Bessemer concerns are doing a tolerable turnover, and the Siemens establishments are steadily occupied. Steel rails are unchanged at late rates, and no particular flow of new orders is to be reported.

SCOTCH PIG IRON

has been easier on the week as regards warrants, in which there is only a limited amount of business, and that on terms favorable to the "bears," whose views and operations are helped by the Scotch statistics as well as by the heavy importations of Cleveland pig iron. The reason for these latter is not clear to the general public, but a key is available to those whose experience is not of yesterday. There are now 93 furnaces in blast in Scotland, against 97 a year ago. In Connal's stores there are 580,876 tons, against 592,007 tons this date 1884. The increase last week was 1,478 tons. Shipments to date are 723 tons in arrears, while the imports of Middlesbrough pig have increased by 15,785 tons.

MIDDLESBROUGH PIG IRON

is dull and flat, the market having been further depressed by the unfavorable returns (appended) of the ironmasters for the month of January. For G. M. B., the current rates, f.o.b. makers' wharves in the Tees, net cash, are, nominally, as under:

No. 1 Foundry	38/	Mottled	33 3/4
2	35/6	White	32 9/16
3	35/	Boiled Metal	32 1/2
4	34/3	Kentledge	37 1/2
4 Forge	33/9	Cinder	31 1/2

The official returns for January of the Cleveland Iron Masters' Association give the make of pig 202,225 tons, a slight decrease on the previous month. The total stocks are 371,417 tons, an increase of 32,728 tons. The shipments were 59,148 tons, against 63,562 in December.

THE BOARD OF TRADE RETURNS

for January, issued to-day, show that the total value of the imports was £36,049,005, against £35,645,221 in January, 1884. The increase was chiefly in respect of raw materials for the textile trades. The aggregate value of the exports was £18,109,525, as compared with £19,352,541 in the same month of last year. The decrease in metals was £780,073, and in machinery or mill-work of £254,566.

DECLINE OF PRODUCTION IN THE IRON TRADE

The secretary of the British Iron Trade Association has just issued a statement showing the production of pig iron in the United Kingdom during the year 1884, as ascertained by returns received from all the iron-making works of the country. The statistics show that during 1884 the production of pig iron throughout the country as a whole was 7,528,000 tons, being a decline of 961,000 tons, or 11% on the quantity made in the preceding year. This is the largest decline that has ever occurred in any one year in the history of the iron trade. Of the total amount of decrease 417,000 tons occurred in Cleveland and Scotland. The actual consumption of pig iron in the United Kingdom in 1884 was 7,383,000 tons, being a decrease of 1,065,000 tons on the consumption of 1883. The stocks of pig iron unsold in the United Kingdom at the end of 1884 were larger by 140,000 tons than those held at the end of the preceding year. The number of furnaces in blast throughout the country at the end of 1884 was only 475, which is a decrease of 64 on the number in blast during the preceding year. Mr. Jean's report contains several other items of information that are of considerable importance to the iron trade, bearing upon the subject of the coal used, which has declined from 2 1/2 tons in 1874 to 2 tons in 1883 per ton of pig iron made; as to the consumption of ore per ton of pig iron, made which is 2.3 tons in the United Kingdom, against 1.9 in the United States and 2.6 tons in Germany; and as to the greatest annual average production of pig iron per furnace in different countries, showing that the greatest annual average production per furnace is obtained in Belgium, the second in the United Kingdom, the third in Germany, and the fourth in the United States.



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NOW, This is to Witness, that, in consideration of the forbearance of the Representatives of the said John Wilson to sue me for damages for the wrong aforesaid, I do hereby undertake and agree,

FIRST, to surrender and deliver to the Attorneys for the said John Wilson, all knives now on hand, and in my possession, or under my control, bearing the said imitation trade-mark, and

SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, any other Cutlery bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1885.

WITNESS—
E. M. REED,
(Attorney for Defendant.)

G. A. ROBINSON L.S.
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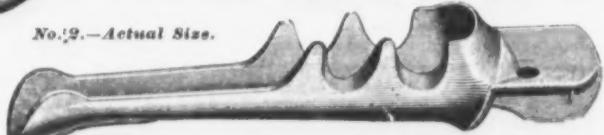
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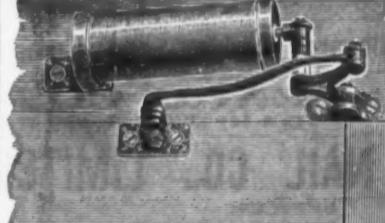
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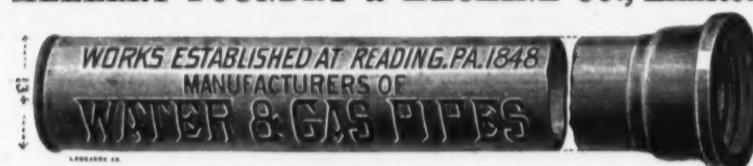
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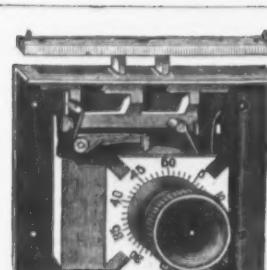
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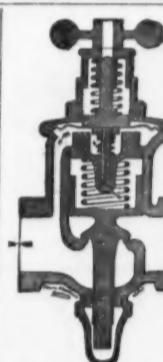
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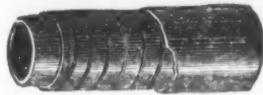
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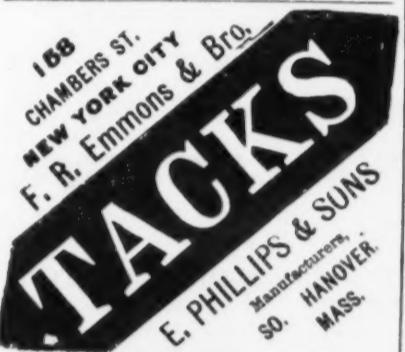
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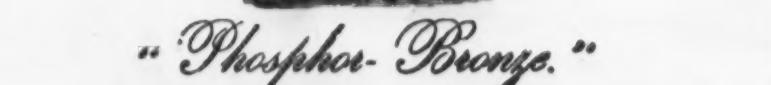
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establishment of his great competitor usually thinks he recognizes a disregard of that which, in his case, would make all the difference between profit and loss; and while he cannot fail to notice that there are advantages in a large plant that a small one does not possess, he also sees disadvantages in a business that has so far outgrown the supervision of the proprietor that he is at all times dependent on the skill and fidelity of subordinates, who, even if skillful and faithful, do not always work together so harmoniously as to insure the best results.

It is unnecessary to take sides in this discussion, but, without doing so, I may say that, in assuming that only the great capitals can safely meet the increasingly sharp competition of trade, we are in danger of mistaking the effect for the cause, and so hopelessly confuse our argument. It is sufficient for our present purpose, however, to accept the fact that the greatness of the now great industrial establishments does not necessarily bar the way to progress for those that are now small. The chances of 20 years are rather in favor of what are now small beginnings, provided they are headed in the right directions, than of the great enterprises that now seem to overshadow their modest competitors. There is a reason for this. A successful manufacturing business is likely in a quarter of a century to outgrow the conditions that made it successful. When there died, in this city, some years ago, a merchant whose name had come to be almost synonymous for business success and uncounted wealth, a great many surprising facts came to light. In the complex structure of his vast business there were hundreds of rotten timbers. Carried from year to year by the sheer force of an enormous capital, it might have gone on for years longer, but it was in no sense profitable as a business. It had millions of dollars' worth of mill property that had not turned a wheel for years, and competition had tapped it at so many points that it was honeycombed through and through. Those who are old in business experience can recall a score of instances in which the great establishments of the last generation have disappeared in this.

The facts that I have presented are significant merely as so many emphatic contradictions of the popular impression that the tendency is toward a monopoly of manufacturing by great corporations. It is toward a monopoly in the hands of those who can manufacture the best product at least cost, and this is not always true of the largest concerns. There is always room enough in the forest for young trees to grow. Those that have already grown may lock their branches overhead, but somehow the saplings manage to get their share of light and heat and nutriment from the soil. This is in the manufacturing industries. Those that take root and begin to grow adapt themselves to the conditions that surround them. As their plant increases, it constantly gains in productiveness. Its development is along the lines of natural progress. Each generation has its own development, and its legacy to the future coming generations will necessarily discard in great part. There is just as good a chance to-day for skill, courage and enterprise as there ever was. Machinery has destroyed the handicrafts to a great extent, but it has given each man muscles of iron and fingers of steel with which to work. The conditions have changed, but the opportunities have broadened and diversified.

Within a few years we have had a great development in this country of facilities for technical education. Large classes are annually graduated, and every year a considerable number of young men, peculiarly well equipped for industrial success, are called upon to decide what they will do in life. That only a small proportion engage in pursuits in which their education gives them an important advantage over young men who have spent in business the years they have passed in college is unfortunately true. Having been brought a great deal in contact with graduates of our technical schools, I know that they are all more or less impressed with the idea that the time is past when a young man without capital or influence has any chance of success in applying his knowledge practically in manufacturing. They seek employment in the service of the great concerns, and generally fail to get it for the reason that very few capitalists care to provide these boys facilities for a post-graduate course. They seek employment as assistants to the management of smaller works; but their qualifications are not usually of a kind much in demand, and they are not, as a rule, willing to accept what they can get. At last, discouraged and disheartened, they make up their minds that no way of utilizing their knowledge is open to them, and they are very apt to go into trade with regret that they had not spent in gaining business experience the time they feel they have wasted in college. Their decision is in most cases based upon an entirely erroneous conception of the opportunities that are open to clever and ambitious young men in the manufacturing industries. In these better and easier than in any other fields of usefulness can a young man who has the elements of success in him afford to be indifferent to his lack of capital and influence. It devolves upon the young engineer who has such education as the schools can give him to select the line of work most congenial to his taste. If he has no preference, he can find cause for congratulation in the fact that one line is as good as another in the average of years. How he begins is a matter of no consequence; but the less he depends upon his academic degree, and the more he relies upon his industry and capacity to learn, the better his chances of starting right and making a steady upward progress. There is always a demand for competent foremen, and a young man who at the bench or in any subordinate position among the wage-earners gives evidence of fitness and capacity beyond his fellows can have promotion without asking for it. What he has learned in college, combined with what he has learned in practical work, should make him so much more competent than foremen usually are that one responsibility after another will devolve upon him. From that point his fortune is pretty much what he may choose to make it.

Capital is constantly on the lookout for men who are distinguished for capacity and skill, and there never has been, and

probably never will be, a time when there is not room for new undertakings to succeed in competition with old ones. These may seem to be mere commonplaces—bits of good advice of the kind ladled out to long-suffering and much-patronized graduates on Commencement Day, but they are something more. I speak for our manufacturing industries. They need every one of the young men who are graduated from our technical and engineering schools—not as superintendents or consulting engineers, but as material out of which to make the great captains of industry who must organize and lead our manufacturing progress to 10 to 15 years hence. Trade offers them no such inducements; the professions hold out no such opportunities. No country of the world has such a promise of extensive industrial development as this. The iron and steel industries offer to any young man of good habits, good courage, fixed purpose and a technical education all the chances of success that the most ambitious could desire. They turn their backs upon these opportunities, less because they are afraid of work than because they are deceived as to the conditions of success in manufacturing, and fail to discover that, notwithstanding the apparent tendency to a monopoly by large capital, there was never a time in the history of the world when equal opportunities were offered for those prepared to lead industrial progress.

Dangers of Natural Gas.

It is in accordance with what is termed the "law of compensation" that with every great advantage that comes to a person or a nation there must be some corresponding disadvantage. Pittsburgh seems to be realizing the truth of this in connection with natural gas. Quite a number of very serious explosions have occurred, not so much in connection with its use, but with its transport. Until some matters of detail regarding its ignition were provided for, some slight explosions occurred in mills, under boilers and in other places where it was used, but, so far as we are aware, there has been no serious danger recently in its actual use for manufacturing or domestic purposes. The trouble has arisen from leaks in the mains. The gas is remarkably volatile, and almost defies restraint. It is a common remark in Pittsburgh that it goes through cast iron as water goes through sand. At the time much of the pipe for its transport through various parts of Pittsburgh was laid there were some legal questions pending that made it important that the line should be laid as rapidly as possible. The precautions necessary to secure the greatest safety in placing this tubing were not possible, and as a result of this and the volatility of the gas, above referred to, quite a number of leaks have been discovered. The explosions that have followed these leaks seem to have wrought injury impartially upon those who use natural gas and those who do not. The escaping gas will, of course, seek the easiest route to liberty; this is not through the frozen ground above it, but through the earth below the frost line. By this route it has found its way into cellars, where it is mixed with the proper proportion of air, and very soon becomes a reservoir of explosive gas, which finds its way into the building above, and, through a lighted lamp or a burning stove, is ignited, and an explosion follows.

It is interesting to note the efforts that are being made to secure safety not only in the use, but in the transport, of this gas. At first there was danger in its use, growing out of the fact that the supply might be suddenly stopped and turned on again without ignition at the point where it was used. One or two slight explosions resulted from this cause. Now, however, shut-off valves and automatic regulators have been provided, so that, in case of the pressure in the main being shut off for any purpose, the valves would close, thus providing against the escape of gas upon pressure in the main being restored. There was also some danger from the great pressure and the possibility of this pressure accumulating in the pipes, owing to non-use of the gas. Safety-valves, however, at different points in the line are being used to reduce this pressure, and means are used to test by compressed-air pressure the tightness of the pipes after being laid and before turning the gas in. Detector or escape pipes are laid which carry off leakage and disclose the location, and several miles of double pipe to take up any leakage have also been laid. It seems, therefore, notwithstanding the danger to which Pittsburgh is subjected by the use of gas, it does not purpose to abandon it. It is altogether too valuable to admit the thought, and, while there are grave difficulties in the way of its use, no doubt these will be overcome, so that in the end its methods of transport will be as safe as those of ordinary illuminating gas.

Mr. Albert F. D'Oench, a practical architect and civil and mechanical engineer, has been appointed head of the Bureau of Buildings of this city, to succeed Mr. Estesbrook, resigned. Considering the peculiarities of the New York municipal government, it must be a pleasant surprise to the public to learn that Mr. D'Oench has not received this appointment for any political reasons, but simply, we are informed, because of his fitness for the position; in fact, there seems to be considerable dispute as to what Mr. D'Oench's politics are, which in itself is sufficient to prove that he is in no sense a "machine man." Another point in favor of this appointment, which is advanced by those qualified to know, is that Mr. D'Oench is both an architect and engineer, having been educated in this country and abroad. This is particularly important when we consider that the Building law is so very narrow in New York that an inspector, to be really efficient, should understand his business sufficiently to decide on the fitness of buildings when the novelty of their construction would bring them outside the strict terms of the law.

Careful estimates of the number of unemployed men in Cincinnati give the total of 16,700 in the skilled trades, including one-fourth of the ironworkers.

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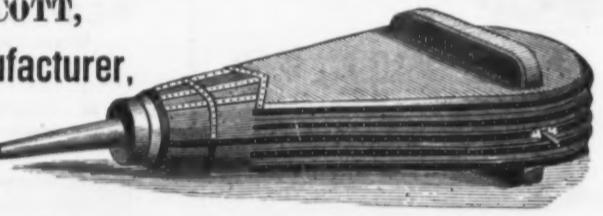
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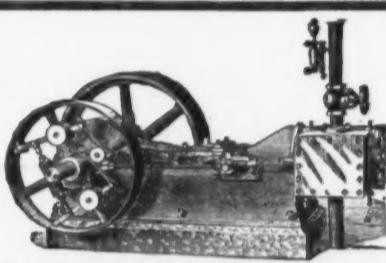
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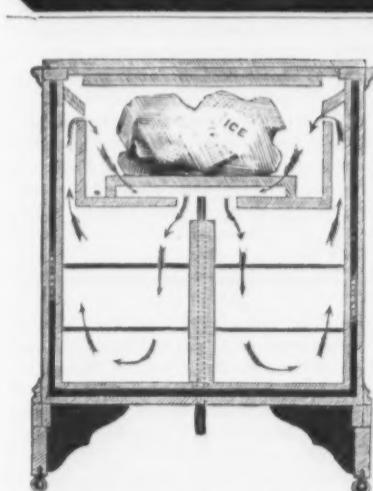
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METALLURGICAL NOTES.

The Basic Process in England.

As was to be expected, some English newspapers are up in arms against the reflection implied in a recent statement which has been going the rounds of the press concerning the progress of the basic process. It was hinted that the comparatively slow development in Great Britain might be due to a lack of enterprise on the part of English steel-makers. The London *Iron Trade Exchange* thus delivers itself on that subject with a good deal of truth: "Our steel manufacturers have no ambition to make silk purses out of sow's ears while they can make them from silk at a smaller cost; they do not desire to lose money by dephosphorizing impure pig iron when they can gain profit by using non-phosphoric iron. The basic process has been a success on the Continent because until its introduction the works there were dependent on importations of Bessemer pig iron from England, or non-phosphoric iron from Spain. Messrs. Thomas & Gilchrist's process enables Continental makers to use their own iron, and, saving the import duties and land carriage on ore or metal suitable for steel-making, amply recoups them for the extra expense of the process and the waste of metal. We repeat what we have asserted on previous occasions—and though our remark may be caviled at, it cannot be disproved—that the basic process has inflicted injury rather than conferred benefit on the iron and steel trades of this country, while it has conferred great benefits on the iron and steel industries of Germany, France, and Belgium. Far be it from us to blame Messrs. Thomas & Gilchrist; on the contrary, we believe that a time will come when their process will be of benefit to our industries, but that time has not come yet. Our steel manufacturers do not grumble at Messrs. Thomas & Gilchrist because of the benefits they have conferred on their rivals abroad; and this is all the more reason why they should not be childishly twitted because they have neglected a process to them at present valueless, and have allowed Continental makers to adopt on a large scale, under circumstances which render it profitable.

A water-jacketed converter has been patented by J. Reese, of Pittsburgh, Pa. The converter consists of a lower stationary section and of an upper dome hinged thereto. The lower section is of tubular form, and has a non-metallic bottom and a fixed metal chamber surrounded by a water-jacketed iron lining. The dome has a non-metallic lining and a water-jacketed air tuyere which is inserted into or withdrawn from the metal in the lower section by closing or opening the dome. The trunnions of the dome are made hollow, and serve as conduits. A constant stream of water is kept running through the tuyere and the water-jacketed converter. Should the metal work cold the water may be allowed to rise near the boiling point, but when the metal works too hot a greater stream of water is used. The converter is more particularly intended for smaller works which require from 50 to 100 tons per day and where a plant of small cost is desired.

A cupola furnace of the kind in which the blast is injected beneath the surface of molten metal has been patented by F. W. Gordon, of Pittsburgh, Pa. The tuyere openings are cut through the wall in a slanting direction from outside in—that is to say, the lower or inside end of each opening is below the level of the metal, while the upper or outside end is above such level. The tuyeres may be elevated out of the molten metal and withdrawn entirely from the walls of the vessel, thus permitting the metal to enter the tuyere apertures without danger of flowing from them. All of the tuyeres may, if desired, be geared to operate simultaneously, and when withdrawn the vessel may be transported and the metal drawn off through the tapping hole. By the use of the peculiar tuyere openings the necessity of using tuyere stoppers or tipping furnaces is avoided.

G. Hatton, of Hagley, England, has patented a converter for the manufacture of iron and steel. In this converter the blast boxes and valves are so placed that they cannot be injured by any leakage of the metal through the lining. The converter is made in two halves, of which the upper is stationary and supported by suitable uprights, while the lower half is removable and attached to the upper half by means of bolts. The air chambers or boxes are located at the sides of the upper part of the converter, and therefore remain fixed. From these boxes extend downwardly and inwardly curved pipes which terminate in line with the tuyeres which pass through the lower section of the converter. Each pipe is made in two lengths, connected by a universal joint. When the lower section of the converter is to be removed the lower end of the pipe is first disconnected, and the pipe is then swung around, so as to be out of the way.

A new refractory lining for Bessemer converters has been patented by H. D. Pochin, of Barnes, England. The inventor objects to the old linings as being subject to rapid wear and being too expensive. He employs chromate of iron and selects such ore as contains the smallest percentage of silica. The chromate of iron is pulverized and mixed with water, tar, melted pitch, crude petroleum or other liquid to such a consistency that the mixture will run freely and fill up the interstices. A cast-iron mold or core is placed inside the converter, and then the lining material is run into the space between the mold and the interior surface of the converter. The lining is to be used in converter employed for the basic and also for those employed for the acid process.

An apparatus for casting and cooling ingots of copper or other metal has been patented by W. F. Durfee, of Bridgeport, Conn., and T. Egleston, of New York City. Beneath the crane arm there is suspended a downwardly-curved double endless chain, to which motion may be imparted by a suitable engine. The molds are arranged in groups of three and are attached to carriers, which in turn are pivoted to the endless chain. To the under side of each carrier there is secured a heavy balance weight. After the first group of molds have been filled, motion is imparted to the chain, and, as the latter hangs downward, the molds are lowered until they are carried into a cooling tank. The horizontal position of the carrier is preserved until its under side comes in contact with an inverting device which causes the molds to turn bottom upward. The ingots, having become sufficiently solidified, will now drop out of the molds and be discharged into a receiving box. This box is placed into the cooling tank below its water line.

The resolution of the late Prime Meridian Conference, establishing a "universal day," to begin for all the world at the moment of mean midnight at Greenwich, went into effect January 1. Hitherto, unlike the civil day, the solar day has begun at noon, or 12 hours after the civil. But henceforth the two will coincide, and will be counted from zero up to 24 hours. This international arrangement was not intended to interfere with the use of local or other standard time where that is desirable, but to unify the astronomical and civil day, and also to gain uniformity in scientific observations and reports of solar and other physical phenomena over the globe. The change is a manifest advantage, both for practical purposes of life and for the scientific collation of physical data. It involves no perplexing calculations to ascertain the actual universal time in any part of America. This will at once be found in every section of this country by simply adding five, six, seven or eight hours respectively to the standard time of the four districts into which the country, for purposes of time reckoning, has been divided.

W. McKenna, of Pittsburgh, Pa., has patented a metallurgical furnace for puddling, heating or refining iron and steel. The space beneath the hearth-plate is divided by

The Iron Age

AND

Metallurgical Review.

New York, Thursday, February 26, 1885.

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The Clapp-Griffiths Process.

The principal features of professional interest during the meeting of the American Institute of Mining Engineers were the papers by Messrs. J. P. Witherow and R. W. Hunt, on the Clapp-Griffiths process. We may well say that they created a sensation, emanating as they did from such sources, and bringing forth points, strongly fortified by figures, which will not only upset the views long held by metallurgists, but promise to bring about wide-reaching modifications in present methods of iron manufacture. There has been a tendency among ironmasters to regard highly the claims brought forward in behalf of the stationary converter as modified by Messrs. Clapp and Griffiths, chiefly because the plant at the works of Messrs. Oliver Brothers & Phillips did not run continuously. The causes of the delays are fully explained by Mr. Witherow. Summarizing the two papers, which we print elsewhere, and which we will follow with an illustrated description of the plant in an early issue, we may divide the subject into its technical and its commercial aspect.

It has not been as thoroughly understood as it should have been that the form of the Clapp-Griffiths vessel is not simply a matter of mechanical detail, but that it has a deeper significance. A misunderstanding of this kind underlies the criticism of Professor Peter von Tunner, whose opinions we recently presented. Mr. Hunt, in his paper, dwells on this point, clearly bringing out the fact that the blowing of the metal through tuyeres placed above the bottom of the vessel causes the reactions to differ from those in the ordinary Bessemer process. So far as known, it leads to an almost complete elimination of the silicon, which has a remarkable effect upon the relation between the chemical composition and the physical properties of the steel produced. The Clapp-Griffiths process does not eliminate the phosphorus; in fact, the percentage of

that element in the steel is higher than that in the pig nearly in proportion to the concentration due to waste in blowing. The cinder contains only traces of phosphoric acid. But the elimination of the silicon is well-nigh complete, and this has upon the mechanical qualities of the steel the effect of permitting a very heavy increase in the quantity of phosphorus without entailing those drawbacks which have always caused that element to be regarded as the bane of the steel-maker. The important fact is thus brought out, anticipated years ago by Dr. Dudley through a brilliant deduction from insufficient data, that low silicon permits of high phosphorus. The quality of these low-carbon, low-silicon and high-phosphorus steels was shown, by many samples exhibited, to be exceptional, and the records of the mechanical tests made fully corroborated them.

The mechanical arrangements of the first plant built, following strictly the English designs, were defective in many details. A new plant has been erected. It is now nearing completion, and will probably be in operation within a few days. The principal change made is the providing of a movable bottom to facilitate repairs, and better arrangements for handling product. The chemical questions have been solved, except that the maximum limit of phosphorus allowable has not been determined. The quality of the product is excellent beyond a doubt, and its uniformity seems assured. It remains only to ascertain by steady, continuous work to what capacity it is possible to carry a plant designed to conform with American ideas in Bessemer practice. This will be settled in a short time. Meanwhile, we have the statement of so high an authority as Mr. Hunt that it has done 80 tons and can probably do 100 tons per day.

Turning to the commercial features of the process, we have Captain Hunt's estimate of cost, from which it will be observed that, taking cupola and converter waste at 15 per cent., the cost of ingot was the cost of pig, for conversion ranges from \$6 to \$6.50 per ton, according to grade of pig iron used. This is for mill works starting with cold pig. For those cases where the iron is run directly into the converter from the blast furnace the cost is reduced by \$1.50. It is estimated, further, that the cost of rolling into nail plate, for which the high-phosphorus metal is particularly suitable, would be about \$2. Coupled with the fact that the quality of the steel produced is very suitable for a wide range of articles, these figures alone are eloquent in behalf of the new process. It possesses other features, however, which we believe should be distinctly pointed out. Comparatively speaking, the plant is small and cheap. It may, therefore, without too great an outlay, be adapted to the production of specialties in comparatively small quantity. A mill costing about \$60,000 and producing from 80 to 100 gross tons of steel ingots could, with adequate rolling plant, produce a very high quality of metal at figures which could not be approached by iron works puddling pig and making muck bar. It could at very much lower cost make steel equal in quality to the product of the comparatively slow and costly open-hearth furnace. Besides possessing the advantage of being able to use cheap pig for the manufacture of a metal of very high quality, it requires for its working none of the skilled labor which makes the product of both the iron rolling mill and the open-hearth plant costly. This will be fully understood when we say that at the Clapp-Griffiths works at Pittsburgh there was only one man paid as much as \$2.50 per day. The new process has therefore in its favor cheap raw material, low cost of fuel, moderate repairs and cheap labor on the one hand, and high quality of product on the other.

The possibilities of the new process are indeed magnificent, and with some of the best of our engineers actively interested in it, they will not be allowed to slip away from any want of knowledge or enterprise. It has been suggested that, since the Clapp-Griffiths process has shown its capacity to turn out with special success mild steels, and since it proves that the elimination of phosphorus is not necessary provided the silicon is removed, therefore it covers the ground occupied by the basic process. It is argued that, since we know that phosphorus need not trouble us, the process with which the late Mr. S. G. Thomas was identified has lost much of its interest. We are not able to share these opinions. We believe rather that the new process fills to some extent the gap between the acid and the basic Bessemer process. The latter, it is now known, cannot generally handle with profit metal running lower in phosphorus than 1 per cent. The Clapp-Griffiths, so far as the tests have gone until now, may be said to have advanced the Bessemer limit of phosphorus to about .5 per cent. How much higher the contents of that element in the pig may go is not as yet ascertained. It will be noted, therefore, that, instead of competing with other methods of Bessemer steel manufacture, it does in reality step into their line, covering to some extent ground which has remained practically unoccupied until now.

Some further information has come to us as to the nature of the relief fund at the Liévin collieries, in France. The miners contribute to this fund 3 per cent of their earnings, to which the owners add 1 per cent. Each widow receives 32 francs a month. The pension ceases, however, if she remarries, but a lump sum equal to two

years' pension is granted as a dowry. Allowances, in addition to this, are made for children, at the rate of 8 francs a month for boys and 6 francs for girls until the age of 12, when they are received into the service of the company.

The Iron and Steel Association's Prophecy of Revival.

The address to the iron and steel trades, published last week by authority of the Executive Committee of the American Iron and Steel Association, has been received with somewhat severe and ungenerous criticism. It is pronounced an unwise and ill-considered document, an effort to "boom" the iron market, and an evidence of a lively imagination on the part of the secretary. Without any conference with members of the Executive Committee or officers of the association, we feel quite prepared to say that we regard the publication in question with approval and are glad it has been published.

The gentlemen present at the meeting of the Executive Committee at which the address was considered and approved were Messrs. B. F. Jones, Samuel M. Felton, E. Y. Townsend, J. B. Moorhead, Joseph Wharton, Percival Roberts, David Reeves, Andrew Wheeler, Wm. E. Coxe, James M. Swank and Geo. W. Cope.

Its adoption shows that at least a majority of these gentlemen approved the publication, and, if any of them had reasons for opposing it, such reasons must have received all the consideration to which they were entitled.

If one should seek advice as to the probable future of the iron and steel trades, he could not select an equal number of gentlemen whose judgment would carry more weight or inspire greater confidence. It is inconceivable that the document was given to the public without exhaustive consideration or without a full knowledge of its effect upon the public mind. The gentlemen composing the Executive Committee of the American Iron and Steel Association do not perform thoughtlessly the duties pertaining to their office.

We do not believe that it was in any sense an effort to "boom" the iron market. The influence of the American Iron and Steel Association has never been used to promote speculation or stimulate excitement. On the contrary, it has been a conservative force of which the speculative element in the trade has often been impatient. The great interests represented in its councils are not helped by "booms," and if one was imminent the membership would gladly avert it at a cost of a million of dollars, every dollar of which could be raised within 48 hours. "Booms" do not begin in the Iron and Steel Association, but they are more likely to be foreseen there than in any place we know of.

It is possible that the document gives evidence of a "lively imagination" on the part of the secretary, but a lively imagination is a good thing under such circumstances. We remember very well that, under conditions very like those which exist at the moment, Mr. James M. Swank announced the end of the depression lasting from the panic of 1873 to the end of 1875, and predicted immediate revival. We remember that the wiseacres of the trade shook their heads, and declared that they could see no grounds for hope that such rosy prophecies would be fulfilled. But when they were fulfilled, as a tornado would fulfill the prediction of a breeze. We hope that in this instance the accuracy of the prophecy will receive much less emphatic vindication.

In reading the address carefully through, we find that the reasons given in support of the belief expressed are consistent with the facts and conclusive. Unless we are wholly mistaken, the conditions are all favorable to revival. If the feeling of hopefulness and confidence expressed in the address can become general we shall see a constant acceleration of the wheels of industry and a rapid reabsorption of the now idle labor of the country. What is said in the address about meeting the incoming Administration in a spirit of confidence, and giving it hearty support until it shall develop a policy hostile to American industry, is eminently wise and sensible. It is impossible, of course, to allay the fears of those who see inevitable ruin in the defeat of the party they have for years supported, but it is possible and desirable that the incoming Administration should be given a fair chance to establish a claim to public confidence. Altogether, we like the document under consideration, and congratulate the American Iron and Steel Association upon its publication. In times like these nothing is more desirable than the courage of convictions, especially when these point in the direction of revival and rest upon a safe and reasonable statistical basis.

A large mass meeting attended by citizens and workmen was held in Brooklyn last week, ostensibly for the purpose of devising measures for the practical relief of the thousands of unemployed workmen in the city. As is too often the case in such meetings, it was controlled by a particular faction, in this instance the Socialistic Labor Party, who, instead of proposing any means for the relief of their destitute brethren, occupied the entire time and exhausted the patience of their audience in making speeches which might be epitomized in the statement that capital is the enemy of labor. Among the radical reforms suggested was the ancient

proposition to abolish machinery and return to unassisted manual labor, by which all present evils would disappear and a new era of happiness to the workmen would be ushered in. Among the many resurrected remedies of the past there is perhaps not one that has less of novelty about it, or is in every way more fallacious, than that which would destroy machinery as the first step toward bettering the condition of the masses. The arguments in its defense have been so many times refuted that it would be useless to notice it were it not that the assertion is always presented by the demagogue, while the reply is too often only to be found in works on political economy which the laboring classes rarely read. If the workman, instead of being carried away by the appeals of the radical so-called reformer, would only devote a little thought and calm reasoning to the subject, and try to inform himself in reference to facts, he would soon see that his condition is far better than that of his ancestors, and that where one dollar was earned half a century ago nearly double the amount is earned now with less labor, while the cost of living has very materially decreased, and he would further see that these advantages are the direct and necessary result of the introduction of and improvements in labor-saving machinery.

The address to the iron and steel trades, published last week by authority of the Executive Committee of the American Iron and Steel Association, has been received with somewhat severe and ungenerous criticism. It is pronounced an unwise and ill-considered document, an effort to "boom" the iron market, and an evidence of a lively imagination on the part of the secretary. Without any conference with members of the Executive Committee or officers of the association, we feel quite prepared to say that we regard the publication in question with approval and are glad it has been published.

Annual Production of Pig Iron in Three Countries.

It is quite remarkable that we should thus early in the year be in possession of the statistics of the production of pig iron in 1884 in the three leading iron countries of the world. This fact shows what attention is now being given to statistical matters in business circles. For, given a man of unlimited enterprise and indomitable perseverance, he would not be able to secure information of a strictly private character from which to form his statistical tables unless the people to whom he applies were willing to impart it, and they would hardly be willing if they did not think that some benefit would result from it. It is very certain that the business men of to-day know very much more about the progress which different countries are making in all lines than was the case even 10 years ago. But the promptness with which statistics of iron and steel production are now obtained is a very considerable element in their value. This year the statistical bureaus of the different countries are surpassing themselves in this respect.

We have before us the figures of the pig-iron production in 1884 in Great Britain, the United States and Germany, in order of their prominence. In each of the two first countries the production of 1884 fell 11 per cent. below that of 1883, but in Germany, according to the official statement of the *Verein Deutscher Eisen- und Stahlindustrieller*, there was an increase of 6 per cent. in 1884 over 1883. The aggregates of each country for these two years are as follows, in gross tons:

	1883.	1884.
Great Britain.....	8,490,000	7,628,000
United States.....	4,595,510	4,097,518
Germany.....	3,890,788	3,672,155
Total.....	16,466,298	15,196,028

The falling off in Great Britain in these two years was 962,000 tons, and in the United States it was 497,642 tons. The gain in Germany was 101,367 tons. The proportionate falling off in the production of Great Britain and the United States will not escape notice. We produced a little over 54 per cent. as much pig iron as Great Britain in both years, and in each country the falling off in 1884 as compared with 1883 was 11 per cent. The depression in the iron trade of the two Anglo-Saxon nations, therefore, seems to have been equally severe during 1884, according to this standard of measurement. Mr. Jeans, the secretary of the British Iron Trade Association, says that the decline in the production of pig iron in 1884 is the largest "that has ever occurred in any one year in the history of the iron trade" of Great Britain. The figures for the year are below those of 1880, when 7,749,233 tons were produced by the mother country.

The increased production of pig iron in Germany is a verification of the statement which has often been made during the past year, but has generally been received with little realization of its significance, that the German iron trade was not in such bad condition as that of either Great Britain or the United States. How much effect the changed fiscal policy of the German Government has had in this direction we do not know, but the inference seems to be that it has been of benefit to iron and steel manufacturers. At the same time German exports of iron and steel have been very large, thus showing that the increase in the manufacture of iron and steel has not been entirely due to internal causes, as also that the higher German tariff is not preventing exportation. The increase in the production of pig iron in Germany has been very decided, every year since 1876 having shown an advance, as indicated by the following table:

Years.	Tons.	Years.	Tons.
1876.....	1,846,345	1881.....	2,914,009
1877.....	1,934,725	1882.....	3,187,951
1878.....	2,147,641	1883.....	3,390,788
1879.....	2,386,581	1884.....	3,572,155
1880.....	2,728,087		

It will be seen from these figures that the growth of the German pig-iron industry has been wonderfully steady. There has been no "boom," no sudden jump of 1,000,000 tons a year, as was the case in this country in 1880, but every year for nine years has

shown continuous growth. The production of pig iron in the United States last year was but 500,000 tons more than that of Germany, while in 1883 this country was almost 1,250,000 tons in advance of its Teutonic rival. If our production this year falls below that of 1884, of which there seems to be a reasonable prospect now, we may find, when next January rolls round, that the United States is third in the list of pig-iron producers and Germany second.

We have no data as to the stocks of unsold pig iron held in Germany at the close of 1884, but Great Britain had 140,000 tons more than at the close of 1883, and the United States held about 53,000 tons more than at the close of the preceding twelve-month. This increase in stocks was quite insignificant in the case of either country when compared with the output of the year.

These three countries together produce about four-fifths of all the pig iron made in the world. No other country makes within 1,000,000 tons as much as Germany. The production of France comes nearest, with an annual output of about 2,000,000 tons. No other country makes 1,

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trade of the two countries is still more striking, as is shown in the following table of production, gross tons being used:

	1883.	1884.
United States	1,148,709	996,465
Great Britain	1,097,174	647,174
Excess United States	51,535	349,291

The decrease in the production of steel rails in the United States in 1884, as compared with 1883, was only 13 per cent., but the production of Great Britain fell off 40 per cent. Our rail trade we know was seriously depressed, but the degree of its depression bears but slight comparison with that of Great Britain. It should be borne in mind that the figures which are here given for British production cover the whole British rail trade, whether for home consumption or export. Although we exported very few rails in 1884, and Great Britain, as usual, exported the greater part of its production, we turned out of our works almost 350,000 tons more than British rail-makers did; and the British manufacturers had the trade of the world to depend upon, while we practically had only our own market.

Our Imports of Iron Ore.

The Bureau of Statistics, in a recent report, furnishes an elaborate table showing the quantities and the values of iron ore imported into this country during the fiscal years 1879, 1880, 1881, 1882, 1883 and 1884, giving at the same time in detail the sources from which these supplies were drawn. Thirty different countries are enumerated, of which the greater number sent only trifling quantities. Deducting the amounts specified as chrome iron ore, which do not in reality belong to the table, since they are the raw material for quite a different industry, we have the following figures as the imports and their values in the years mentioned:

Imports of Iron Ore.		
Fiscal year.	Quantity.	Values.
1879.	Gross tons.	\$349,034
1880.	425,012	1,192,961
1881.	620,008	1,697,124
1882.	575,618	1,571,835
1883.	605,516	1,549,764
1884.	553,806	1,817,546

It will be noted that in the aggregate these imports continue to be important in spite of the depression here, a fact due largely to the steady decline of values of ore in Spain and other producing countries, and to an unprecedented fall in freights. Both these factors combined have nearly compensated for the lower selling price here, and have kept the imports at very near the high-water mark of 1881.

An analysis of the details given in regard to the sources from which these ores came indicates some important facts. Turning first to Spain we have the following series of figures:

Iron-Ore Imports from Spain.		
Fiscal year.	Quantity.	Value.
1879.	Gross tons.	\$154,211
1880.	194,807	311,074
1881.	200,000	304,000
1882.	145,695	508,970
1883.	343,337	770,988
1884.	374,943	839,426

These figures show an almost uniform growth, and prove that Spain is gaining ground over other competitors, its percentage of the total imports being in 1884 67.7 per cent. as compared with 42.5 per cent. in 1881.

Next in importance are the French possessions in Africa, which sent the following quantities:

Iron-Ore Imports from Algeria.		
Fiscal year.	Quantities.	Values.
1879.	Gross tons.	\$68,150
1880.	91,727	232,000
1881.	111,345	348,280
1882.	111,580	312,672
1883.	108,100	299,786
1884.	56,448	109,920

The Bone and other Algerian mines are evidently dropping out of the race, and in 1884 sent slightly less ore than those of Sardinia, for which the following figures are submitted:

Iron-Ore Imports from Italy.		
Fiscal year.	Quantities.	Values.
1879.	Gross tons.	\$20,786
1880.	39,297	79,386
1881.	44,177	132,218
1882.	46,453	150,511
1883.	46,137	140,827
1884.	39,125	71,900

Another quarter from which we get considerable ore, and which it is frequently predicted will become the most dangerous rival of our own mines, is Canada. American capitalists have within the past few years spent very heavy sums of money, but, at least in one conspicuous instance, the funds needed are far in excess of original estimates, and the enterprise is now languishing.

Iron-Ore Imports from the Dominion.		
Fiscal year.	Quantity.	Values.
1879.	Gross tons.	\$8,043
1880.	3,904	28,043
1881.	29,297	79,386
1882.	44,177	132,218
1883.	46,453	150,511
1884.	46,137	140,827

Cuba does not yet appear in the list, the shipments not having been made until the beginning of the fiscal year 1885. It may be noted, however, that Greece occupies, for the first time, a comparatively high rank in 1884, with 12,530 tons of iron ore.

The entire imports are, of course, insignificant as compared with the large quantity of ore consumed by our furnaces. They are very heavy, however, when they are contrasted with the output of the mines of New Jersey and New York.

The Sirius and Great Western.

NEW YORK, February 19, 1885.

To the Editor of The Iron Age.—DEAR Sir: In your issue of February 19, page 7, you say the Great Western and Sirius both made the voyage to New York in 18 days. Please allow me to change this. The Sirius,

from Cork to New York, 700 tons, 18 days, and the Great Western, Bristol to New York, 1,340 tons, 15 days, both arrived in New York April 23, instead of June 17, 1883. The *Marine Journal* is in error, I think. Respectfully, A. WARD.

Sidney Gilchrist Thomas.

The announcement of the death of Sidney Gilchrist Thomas, in Paris, on February 1, tardily received by mail, will cause much sorrow to his many friends in this country. His worth is so well known and his triumphs so recent that we need refer to them but briefly.

Sidney Thomas was born in April, 1850, and was educated chiefly at Dulwich College, with a view of entering the medical profession, in which his brother, Dr. Llewellyn Thomas, was a well-known specialist, though his own inclinations were toward engineering. His father's death, however, rendered this impossible, and at the age of 17 he entered the British civil service. In 1870, while attending a course of lectures on metallurgy at the Birkbeck Institution, the idea of dephosphorization first took strong hold upon his mind. To use an expression which at that time he was fond of quoting, "the man who eliminates phosphorus by means of the Bessemer converter will make his fortune;" and the commercial idea here expressed was quite as much in his thoughts as the scientific nature of the problem. He proceeded in a strictly logical manner in the study of his chosen subject. Collecting all the data, both chemical and practical, he came to the conclusion, as Gruner had done,

small quantity of 6 pounds up to 10 cwt., and the results all carry out the theory with which I originally started, and show that in our worst cases 20 per cent. of phosphorus was removed, and in our best I must say that 99 per cent. was removed, and we hope we have overcome the practical difficulties that have hitherto stood in the way." The announcement was received in silence and the subject was dropped. Mr. Thomas's paper describing details of the process was down for reading at the Paris meeting of the Institute in September, 1883, but was last on the list, and was needlessly postponed till the following May, when it was discussed with the greatest interest by a crowded meeting. Copies of the paper had been liberally distributed in Paris, and so had been carried thence all over Europe and America, so that every one interested had six months to study and criticize.

Meanwhile, Mr. Windsor Richards, of Bolckow, Vaughan & Co., whom Thomas in Paris at the meeting just referred to, was prevailed upon to try the process. This he did with the greatest thoroughness and fairness, at an immense expenditure of time, money and thought, and ultimately the first man who made the process a true commercial success in England adopted it in the works under his management. From this also much of the foreign appreciation of the process is certainly due, owing to the facilities given by Mr. Richards for study by visitors. A claim to priority had been advanced by Mr. Snelus, and a contribution toward basic brick-making had been made by Mr. E. Riley, both of which were met with characteristic fairness by Thomas, and, instead of going to law between themselves, the parties

American Institute of Mining Engineers.

(Second Notice.)

New York seemed bent on showing the visiting members of the Institute the full extent of its resources in the way of weather. Those who arrived on Monday were welcomed with a northeast gale, and crossed the river on the highest tide in the memory of man. Even that truthful relic, "the oldest inhabitant," shook his head and wisely preserved silence about this tide. Monday it snowed and rained and hailed: Tuesday it blew a most biting, chilling wind: Wednesday in the early forenoon it snowed, and the members who tardily wended their way to Hoboken to the Stevens Institute of Technology, where the

Wednesday Morning Session

was held, crossed the river through floating ice and the streets of Hoboken through snow drifts. But the warmth of the welcome was commensurate with the severity of the weather. Professor Thurston's lecture-room at the Institute was filled, and before the session was over and the members gratefully accepted the noon-day hospitality of Professor Morton the sun was shining again and the snow melting.

The first paper of the session, read by the secretary, was by W. I. Pierce, of New York City, on

THE COST OF GOLD MINING AND MILLING IN NOVA SCOTIA.

After giving a *résumé* of the legal conditions of gold mining in Nova Scotia, the paper dealt with the statistics of this industry. Since 1862, when statistics were first kept, 350,000 ounces of gold have been produced from 470,000 tons of rock. The yield has been from 10 to 20 dwt., a ton, with an average of 14 dwt. The statistics show a steadily decreasing yield of gold per ton. This is due chiefly to the more extensive use of machinery, which has permitted the use of lower-grade ores. The description of the methods used included a statement regarding the ingenious and extensive application of the transmission of power by wire rope.

Mr. P. Barnes, of New York City, followed with an interesting paper on

FUEL ECONOMY IN ENGINES AND BOILERS.

The paper set forth the need of the more intelligent and economical preparation and use of steam, pointed out the directions in which this economy was to be sought, and made some suggestions as to remedies and means. A form of stayed box boiler, the details of which were explained, was suggested as safe, economical and practical.

Professor Thurston, in the discussion which followed, briefly, but graphically, sketched the requirements and the limitations of the economical working of the steam engine and boiler and indicated the direction in which improvements were to be sought, and the limitations that would be met with in the search.

Mr. Wm. Kent was inclined to believe that the form of boiler proposed would be a failure, especially when using bad water.

In the absence of Mr. John Fulton, of Johnstown, Pa., Dr. Raymond, the secretary, read his paper on

THE SOURCE AND BEHAVIOR OF FIRE GAS IN THE MINES OF THE CAMBRIA IRON COMPANY, JOHNSTOWN, PA.

In the beginning of the paper the history of the Cambria Iron Company, the location and surroundings of Johnstown, situated in a cutting of the lower productive coal measures, 500 feet deep, were sketched; a brief description of the coal beds and ore mines followed, from which it appears that six of the seven coal mines and the iron-ore mines are from 10 to 200 feet above the valley water level, and but one coal mine, now closed, below. The paper also gave detailed statements of the fire gas in each mine and the explosions in connection with it. Three of the coal mines—the Rolling Mill, Coshun and Woodvale—are dry, with considerable coal dust in the main ways. Four—the Blast Furnace, now closed, Lower Gaultier, Conemaugh and the iron ore mine—are all wet. The most destructive explosions so far have occurred in the wet mines.

The coal of the Johnstown sub-basin are exceptionally low in volatile matter. The two principal seams increase in volatile matter both eastward and westward. At Bennington, 25 miles east, the beds contain 26 per cent., while at Johnstown they have 15 to 21 per cent. Westward, the increase of coal dust in the main ways, from 4 to 10 per cent., is regular, and the maximum is reached near Pittsburgh.

The source of fire gas, causing flashings and explosions in mines, has not received as careful consideration as its importance would seem to demand. From the fact that it has been found in all the coal beds mined into at Johnstown, it has been inferred that each coal bed, with its rich associated bituminous shales, has produced the gas met with in their respective mine workings.

This inference was doubtless suggested, in part at least, from the condition of the anthracite fields in the northeast section of the State. For it appears evident that the fire gas found in these large coal beds was eliminated by the heat that transformed the normal coal into its present condition of glassy anthracite, each bed of the coal affording more or less fire gas, the bed itself being the chief source. It is quite possible that in the mining operations in the anthracite fields that gas may ascend from the lower to the upper beds of coal if the latter are first mined into. Three objections seem to overwhelm the assumption that the coal beds of the Allegheny are the sources of fire gas:

1. The fact that, where one coal bed has been mined in part or entirely under another, the upper coal-bed workings are entirely free from gas.

2. If the coal beds are the sources of fire gas in this portion of the Allegheny field, then all the mines eastward in the same field should produce fire gas. No gas has yet been found in the large number of mines east of Johnstown. The same absence of fire gas is noticed in the mines of the Clearfield region. In the Broad Top field fire gas is

unknown in any of its mines. These mines have been extensively worked above and below water level during the past 25 years without the least evidence of the presence of gas. The same absence of gas is observable in the

three $\frac{1}{2}$ -inch pipes inserted in the plates and hopper to permit of measuring the height of the stock in the furnace. A small stream of water was run into the stock through these pipes, and in a short time the temperature was reduced to 700° . Sufficient water was used to keep the temperature at this point until the stock was down to within 4 or 5 feet of the tuyeres, when a larger quantity was used in order that the furnace might be quite cool when the bell was swung. Too much was used and the furnace was partially chilled. After some clearing of the tuyeres and putting on the blast they brightened some, but the pressure ran up to 14 or 15 pounds, and the engine just turning over. A hole large enough to take in a 3 inch boiler tube was drilled in the cinder notch at such an angle that the tube would strike the bottom of the hearth at the center. A piece of 3 inch boiler tube was plugged at one end with wood loaded with 5 pounds dynamite (No. 2 giant powder), two fuses with two caps attached, lighted and put in the furnace. The explosion did no harm, but broke up the cemented stock. The belly-pipes were replaced and the blast put on, showing a pressure of only 2 pounds. The tuyeres brightened and cleared themselves of cinder, and in 3 hours cinder was tapped at the notch. Every furnace man who knows the difficulty of bringing out a furnace that is chilled solid in the hearth, not with iron, for this seldom occurs, but with cinder, and who knows that there is no relief until a clearance can be made through or up to the loose stock, will realize the advantages in the use of a few pounds of dynamite. Its explosion breaks up the salamander of cinder and coal in an instant sufficiently to allow the blast to enter and the gas to escape, thus accomplishing in a moment what would otherwise require days.

Another case in which Mr. Taylor found the use of dynamite of great advantage was when the stock "bridged" on the boshes in blowing in. Regarding its use for this purpose he states:

"I have had this occur twice at the Chester Furnace, and on both occasions the relief was complete. The first time it occurred the stock stopped settling entirely in about 6 hours after putting on the blast. The furnace got tighter and tighter till the pressure was about 15 pounds, with the engine just turning over. The tuyeres were all bright and good and dry, but there was no escape for the gas except where it was breaking through the walls about the tuyeres. This was the condition of things after blowing about 12 hours. The stock had not settled any for 6 hours. I was well satisfied by this time that the coal had bridged or arched on the boshes, and as the ore above it was reduced and disintegrated it worked down into the interstices till they were all closed, leaving no vent for the gases; hence the high pressure. Nothing could be done till the arch was broken. We stopped the engine and drilled a hole into the furnace about 13 feet above the tuyeres, where we found, as I expected, a cavity nearly the full diameter of the furnace and about 6 feet from the top of the lower or loose coal to the under side of the circular arch. We charged a 2-inch gas-pipe with about 7 pounds of dynamite, in the same way as before explained, and exploded it as near the center of the cavity as we could, so that the concussion would break the arch. No harm was done except to drive the clay packing out from one of the tuyeres and raise a little dust on top, and the result was a complete success. The arch was broken and the stock settled immediately. We closed up the hole and put on the blast, and the furnace traveled right off as though nothing had happened."

"My second experiment was just the same, only the stock did not settle 6 inches from the time the blast went on till we were struck by the high pressure and break-outs at and above the tuyeres in about 6 hours. On opening the same hole we found the bridging and all conditions practically the same as in the first case, but the explosion did not seem to break the arch as thoroughly, and as near as we could tell only about two-thirds of it came down; consequently, the furnace settled faster on one side than on the other. We drilled on the high side, about 15 feet above the tuyeres, the next day, and found the stock settled the same on that side as on the other, and the furnace was normal."

"I have also tried the effect of powder on dry walls or partial scaffolds after the furnace had been in blast for some time, by exploding a moderate quantity of powder—say, one or two cartridges—just inside the walls where the stock was not moving, but never got any permanent benefit from it. It would seem that the stock was too pasty, confining the effect to a very small space, while in the case of the bridging the blast had been on such a short time that the stock at that point was only red-hot; hence it was dry instead of pasty, and in good condition for the action of the powder. In the case of the explosion in the hearth, the cinder was all cold and set, which also made the conditions right for breaking up the whole mass with an explosive. A bad ring scaffold might, I think, be removed if it was pretty well up in the furnace and the furnace was blown down below the bottom of the scaffold and a few capped cartridges dropped in from the top; or a hole could be drilled in from the side, where the thickness of the stock would admit of it, at a point below the scaffold and over the loose stock, and the powder put in a pipe; or a hole might be drilled from the outside directly into the thickest and strongest part of the scaffold and near the bottom of it. In this way the powder might break the ring, thus bringing down the whole scaffold. If not, one or two more holes might be put into the scaffold where it was not broken. I have had no experience in this, however, as I have had no ring scaffold to contend with; since I learned the use of powder; but I think now I could break down ring scaffolds with powder that formerly I would have blown out for."

"Whenever powder is to be exploded where there is sufficient heat to ignite the exploders in a short time, no fuse need be used, but I always put more than one exploder in with the powder—two or three would be better. When the heat is not sufficient I put in two fuses, to make sure of one, and light the fuses first, and then slide the pipe in the hole to the point where the explosion is wanted. In

either case the pipe should be tamped with sand on top of the powder, same as in an ordinary rock blast, but I never did any tamping around the pipe after it was inserted for exploding. A boiler tube with a wooden plug driven in one end is better for loading than gas-pipe, as it is not so thick and strong."

"Returning to the use of the water spray for blowing down, I would say I blew down the straight furnace once after the time previously mentioned, and also blew out both times with it with complete success and without chilling the hearth or getting any water in the belly-pipes, one experience of that kind being quite sufficient. I am satisfied this is the simplest and easiest way of either blowing down or blowing out a furnace, as the evaporation of a small amount of water absorbs a large amount of heat. If there is a hole near the center of the bell large enough to admit, say, a $\frac{1}{4}$ -inch pipe perforated at or near the end with small holes equal to, say, one-half the area of the pipe and then put on a good pressure of water, commencing soon after blowing down is commenced and before the bell and down-comer get hot, there is no trouble to hold the temperature of the escaping gases to, say, 800° or 900° all the way down, by regulating the quantity of water to suit, particularly if plenty of water is kept in the bell and hopper. Of course the more the water is split up in a spray the better the gases can act on it and vaporize it before it reaches the coal or stock, and the less water is required. Little or no more water should be put in than does vaporize before reaching the stock, but we found no chilling below when we only put in water enough to hold the pyrometer at about 900° , against about 600° , which was the temperature we reduced the gases to just before stopping, the first time we used water and chilled."

The last paper of the session was an illustration on "A New Regenerative Hot-Blast Oven," by John C. Long, Mechanicsburg, Pa., which we shall present in full in a future issue.

At the close of the session the members and their ladies were entertained by President and Mrs. Morton at luncheon, at their residence, near the Institute.

The afternoon was devoted by the members to visiting various points of interest to which invitations had been extended. Quite a number accepted the invitation of Lieutenant Derby, the officer in charge of the Government tunneling at Flood Rock, East River, to visit and inspect the condition of the work for removing the last obstacle to Hell Gate navigation.

Wednesday Evening's Session

was held in the hall of the New York Academy of Medicine. The large attendance that characterized all the meetings was still kept up. The first paper was by Mr. J. P. Witherow, of Pittsburgh, Pa., on

THE CLAPP & GRIFFITHS PROCESS.

Mr. Witherow, after a narrative of the circumstances which led Mr. Henry W. Oliver, Jr., of Messrs. Oliver Brothers & Phillips, Pittsburgh, and himself to become interested in the process during the course of a visit to England describes as follows the results of the work done after it had been decided to put up a converter at the works of Oliver Brothers & Phillips, at Pittsburgh:

The completion of Mr. Oliver's converter was much delayed, owing to our having decided to make it an exact copy of the 3 ton converter we had seen in Wales. We also bought bricks for the lining and for tuyeres and tuyere-blocks in England, and had to await their arrival. From these causes we were not able to commence until the beginning of April. The materials for the converter were brought from abroad simply because we wished to have everything the same as was in use there. When the converter was put in operation everything seemed to go off satisfactorily, and the first blow, although it took much longer (everything being cold), made excellent steel. After starting up the next day and making a few blows, it was found that the tuyeres and tuyere-blocks were burned off, and that the reactions of the converter had torn the lining all to pieces. The conclusion was at once reached that we had made a great mistake in ordering the fire-brick from the Stourbridge Works instead of from the fire-brick factory in Wales, at which the parties there got their tuyeres and tuyere-blocks made. Mr. Oliver, therefore, at once cabled to have new tuyeres and tuyere-blocks sent from Wales, and operations at the converter were suspended until these should arrive. It required six weeks before they were delivered and the converter was ready for blast again.

Although at the second starting up much better work was done than before, still the blast had been on such a short time that the stock at that point was only red-hot; hence it was dry instead of pasty, and in good condition for the action of the powder. In the case of the explosion in the hearth, the cinder was all cold and set, which also made the conditions right for breaking up the whole mass with an explosive. A bad ring scaffold might, I think, be removed if it was pretty well up in the furnace and the furnace was blown down below the bottom of the scaffold and a few capped cartridges dropped in from the top; or a hole could be drilled in from the side, where the thickness of the stock would admit of it, at a point below the scaffold and over the loose stock, and the powder put in a pipe; or a hole might be drilled from the outside directly into the thickest and strongest part of the scaffold and near the bottom of it. In this way the powder might break the ring, thus bringing down the whole scaffold. If not, one or two more holes might be put into the scaffold where it was not broken. I have had no experience in this, however, as I have had no ring scaffold to contend with; since I learned the use of powder; but I think now I could break down ring scaffolds with powder that formerly I would have blown out for.

"Whenever powder is to be exploded where there is sufficient heat to ignite the exploders in a short time, no fuse need be used, but I always put more than one exploder in with the powder—two or three would be better. When the heat is not sufficient I put in two fuses, to make sure of one, and light the fuses first, and then slide the pipe in the hole to the point where the explosion is wanted. In

either case the pipe should be tamped with sand on top of the powder, same as in an ordinary rock blast, but I never did any tamping around the pipe after it was inserted for exploding. A boiler tube with a wooden plug driven in one end is better for loading than gas-pipe, as it is not so thick and strong."

"Returning to the use of the water spray for blowing down, I would say I blew down the straight furnace once after the time previously mentioned, and also blew out both times with it with complete success and without chilling the hearth or getting any water in the belly-pipes, one experience of that kind being quite sufficient. I am satisfied this is the simplest and easiest way of either blowing down or blowing out a furnace, as the evaporation of a small amount of water absorbs a large amount of heat. If there is a hole near the center of the bell large enough to admit, say, a $\frac{1}{4}$ -inch pipe perforated at or near the end with small holes equal to, say, one-half the area of the pipe and then put on a good pressure of water, commencing soon after blowing down is commenced and before the bell and down-comer get hot, there is no trouble to hold the temperature of the escaping gases to, say, 800° or 900° all the way down, by regulating the quantity of water to suit, particularly if plenty of water is kept in the bell and hopper. Of course the more the water is split up in a spray the better the gases can act on it and vaporize it before it reaches the coal or stock, and the less water is required. Little or no more water should be put in than does vaporize before reaching the stock, but we found no chilling below when we only put in water enough to hold the pyrometer at about 900° , against about 600° , which was the temperature we reduced the gases to just before stopping, the first time we used water and chilled."

The last paper of the session was an illustration on "A New Regenerative Hot-Blast Oven," by John C. Long, Mechanicsburg, Pa., which we shall present in full in a future issue.

At the close of the session the members and their ladies were entertained by President and Mrs. Morton at luncheon, at their residence, near the Institute.

The afternoon was devoted by the members to visiting various points of interest to which invitations had been extended. Quite a number accepted the invitation of Lieutenant Derby, the officer in charge of the Government tunneling at Flood Rock, East River, to visit and inspect the condition of the work for removing the last obstacle to Hell Gate navigation.

THE CLAPP & GRIFFITHS PROCESS.

Mr. Witherow, after a narrative of the

process and the metal produced in it, it may perhaps be of interest to the Institute to learn the conclusions which I have formed. Of course, it is well known that the stationary converter of small size is the very oldest type of vessel used in the pneumatic process. Hence it will be only necessary to call your attention to the points which are special features of the Clapp-Griffiths. This converter has a slag tap-hole, situated at such a height in relation to the metal under treatment that, when the cinder is formed and boils up as the blow progresses, it can run off and thus be removed from contact with the iron, and will also be out of the way when the decarbonized metal is tapped into the casting ladle and the manganese alloy added. The manner of shutting off the blast when the process is completed and the metal is being tapped is another distinctive feature. The tuyeres are situated around the sides of the vessel, and enter the interior some little distance above the bottom; they are provided with plugs through the center of which there is a small opening. When the blow is completed these plugs are forced forward into the outer orifices of the tuyeres, thus shutting off the blast, excepting the small quantity entering through the passages named. While this is sufficient to keep the metal from running into the tuyeres, it reduces the action of the blast while the metal is being tapped to the minimum. Of course, this is of great importance, as in an ordinary stationary converter any delay in getting open the tap-hole means overblowing, and even while the first part of the charge is running out the oxidation is in full force. Duplicate or movable bottoms are used, thus more than doubling the possible output of the plant. The pressure of blast is quite light, never exceeding 8 pounds, and usually only 5 pounds is used. To the Bessemer engineer accustomed to large converters and great output a plant of converters having a capacity of some 4000 pounds at each heat seems like a plaything and one with which it would be impossible to compete against the larger plants. Certainly such were my first impressions, but I can assure you the matter will bear investigation. In the first place, a complete plant of two vessels can at the present time be constructed for not over \$55,000, including all buildings, and I am satisfied that 80 gross tons of ingots per 24 hours can be made in it with the greatest ease, and no doubt this output could be brought up to 100 gross tons. The strain upon all the parts of the plant being so light, the item of repairs is very low, and the general operating expenses are small. I therefore believe the Clapp-Griffiths converter will be found desirable for existing works whose products in the past have been exclusively wrought iron. By a comparatively small outlay they can meet the growing demand for steel, and thus give the world its advanced material without rendering idle and useless many thousands of capital.

One thing I would state, before closing, relative to the application of this type of converter directly to blast furnaces, and to the question whether we will not experience difficulty in keeping the metal liquid between casts. As you are well aware, at many plants abroad the molten iron is conveyed from 3 to 4 miles from the blast furnace to the Bessemer converters, and then often it has to wait a considerable time before being poured. And, as you are also aware, at all Bessemer works, such as our great Edgar Thomson plant, where the direct process is used, the molten iron frequently remains in the cars from 3 to 4 hours before being poured into the converter. I have assumed that a blast furnace using this type of converter would cast every 4 hours, and that the whole cast would be run into two or three cars, according to its amount—into two cars if the quantity would be from 15 to 20 tons; that these cars would be heavily lined with fire-brick, which would be washed and dried, so as to prevent, as far as possible, the adhesion of the iron; that a movable lid would be placed thereon, which would also be heavily lined with fire-brick, which cover would be lifted by a crane when the car arrived at the converter. The contents of the first car would then be converted into iron or steel (say it would be from \$3 to \$4 per ton, which would include the 10 or 12 per cent. waste). If, therefore, the owners of blast furnaces by an expenditure of some \$30,000 can convert their product into ingots instead of pig iron at a cost not exceeding from \$3 to \$4, the charge nearly doubling its value, it certainly places the blast furnaces in a different position from the one they occupy at present, and I think that no improvement has ever been introduced at a more opportune time or deserved a warmer welcome than such a process applied at this time to blast-furnace practice.

From a commercial point of view we have made at the Oliver plant during the past summer and fall about 2000 tons of steel; and, apart from what we consumed, much of this was sold to parties through whom we wished to introduce it to the trade, and all parties who have used it have ordered more. We have carefully kept account of our expenses while making these 2000 tons, and find that, including cost of ferromanganese, coke and keeping up the plant, expenses for steam power, labor and everything connected with the process, its cost did not exceed \$6.50 per ton over the price of the pig iron used. It should be remembered that while making the 2000 tons we experienced all the setbacks and interruptions I have referred to, and the plant being the first experimental one, the expense for labor, &c., was much larger than with our present experience it will be hereafter. We feel, therefore, that we are safe in assuming that the process can be conducted in mills at a cost not exceeding \$6 per ton, and at blast furnaces, in the manner I have described, for from \$3 to \$4 per ton, as above stated.

Now, since it requires an expenditure of \$12.50 to convert a ton of pig iron into muck bar (which is the general cost at our Pittsburgh mills), and since by our process a ton of pig iron can be converted into steel blooms at a total cost of about \$6 in mills, and from \$3 to \$4 at furnaces (in the latter case saving also a part of the freight on the pig metal to the mills), you can from these data form some estimate of what the economy to our iron trade will be when this process shall be in general use at our mills and furnaces. I am not insensible to another important consideration which, I have no doubt, has presented itself to the minds of many, viz.: Will not the quality of the product be entirely dependent on the quality of pig metal the furnace is producing, and will not the many changes that blast furnaces undergo both in quality and grade of pig metal materially affect, if not destroy, the application of such converters to blast-furnace practice as I assume?

THE CLAPP-GRIFFITHS PROCESS.

Having devoted considerable time to the investigation of the Clapp-Griffiths converter and the metal produced in it, it may perhaps be of interest to the Institute to learn the conclusions which I have formed. Of course, it is well known that the stationary converter of small size is the very oldest type of vessel used in the pneumatic process. Hence it will be only necessary to call your attention to the points which are special features of the Clapp-Griffiths. This converter has a slag tap-hole, situated at such a height in relation to the metal under treatment that, when the cinder is formed and boils up as the blow progresses, it can run off and thus be removed from contact with the iron, and will also be out of the way when the decarbonized metal is tapped into the casting ladle and the manganese alloy added. The manner of shutting off the blast when the process is completed and the metal is being tapped is another distinctive feature. The tuyeres are situated around the sides of the vessel, and enter the interior some little distance above the bottom; they are provided with plugs through the center of which there is a small opening. When the blow is completed these plugs are forced forward into the outer orifices of the tuyeres, thus shutting off the blast, excepting the small quantity entering through the passages named. While this is sufficient to keep the metal from running into the tuyeres, it reduces the action of the blast while the metal is being tapped to the minimum. Of course, this is of great importance, as in an ordinary stationary converter any delay in getting open the tap-hole means overblowing, and even while the first part of the charge is running out the oxidation is in full force. Duplicate or movable bottoms are used, thus more than doubling the possible output of the plant. The pressure of blast is quite light, never exceeding 8 pounds, and usually only 5 pounds is used. To the Bessemer engineer accustomed to large converters and great output a plant of converters having a capacity of some 4000 pounds at each heat seems like a plaything and one with which it would be impossible to compete against the larger plants. Certainly such were my first impressions, but I can assure you the matter will bear investigation. In the first place, a complete plant of two vessels can at the present time be constructed for not over \$55,000, including all buildings, and I am satisfied that 80 gross tons of ingots per 24 hours can be made in it with the greatest ease, and no doubt this output could be brought up to 100 gross tons. The strain upon all the parts of the plant being so light, the item of repairs is very low, and the general operating expenses are small. I therefore believe the Clapp-Griffiths converter will be found desirable for existing works whose products in the past have been exclusively wrought iron. By a comparatively small outlay they can meet the growing demand for steel, and thus give the world its advanced material without rendering idle and useless many thousands of capital.

This is for metal made from an ordinary Bessemer iron, but if, as I will show later, that for many purposes a cheaper iron can be used, my figures would be:

Iron	\$17.00
Fifteen per cent. loss	2.55
Coal	1.50
Ferromanganese	.90
Refractories	.20
Molds	.15
Expense and repairs	.50
Total	\$23.10

This is for metal made from an ordinary Bessemer iron, but if, as I will show later, that for many purposes a cheaper iron can be used, my figures would be:

Iron	\$16.00
Fifteen per cent. loss	2.40
Other items	.55
Total	\$21.95

Either of these figures are certainly under the cost of muck bar in the most favored localities; but it may be said that we have in the one case ingots which have to be broken down, while in the other bars which may be piled and rolled direct. I think this account will fully balance itself in this way—for all large sizes of iron made from puddled bar you must have a reworked top and bottom, and for very small ones billets, while by using proper sized and shaped ingots, and careful work in the steel pit, they can be rolled direct into many things. It is in this respect that the small plant differs from the large one. With a product of 400 to 500 tons per day, it is impossible to submit to the delay incident to casting small ingots. With the smaller product, but still one which is up to the maximum of economy of the plant, no delay is caused. The next thing to be considered after the cost of making the product in the Clapp-Griffiths converter is the quality of the metal produced. In the Clapp-Griffiths plant of Messrs. Oliver Bros. & Phillips many hundreds of tons of this metal have been made and placed on the market in different forms, such as tacks, rivets, wire rods, telegraph wire, lightning-rods, horseshoe nails, pipe strips, plates, sheets, bars, angles, shovels, spades and stamping iron, and, as far as I have been able to ascertain, great satisfaction has been obtained in its use for these various purposes. In fact, large quantities have been used in the place of imported Swedish bars with success, and the workmen manipulating it were none the wiser. When first starting the works the best brands of English Bessemer irons were used, and the steel produced was of a most satisfactory quality. But I am assured that this grade of pig was continued for a very short time. Indeed, I am under the impression that altogether less than 100 tons of this iron was ever purchased for the works. The metal produced so far exceeded all requirements that the use of iron of a lower standard was ventured upon, hundreds of

(Continued on page 27.)

February 26, 1885.

THE IRON AGE.

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February 26, 1885.

THE IRON AGE.

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Special Notices.
FOR SALE.Extensive Water Fronts
ON THE
HARLEM RIVER,
CITY OF NEW YORK.

SUITABLE for the economical handling and storage of large quantities of material or for the erection of **Warehouses, Foundries, Machine shops, &c., &c.**, where water facilities are required.

PARCEL NO. 1. Area, 78 lots, 25 x 100 feet; river front, 1470 feet.

PARCEL NO. 2. Area 78 lots, 25 x 100 feet; Mots Haven Canal water front, 500 feet.

PARCEL NO. 3. Area, 186 lots, 25 x 100 feet; river front, 300 feet.

The above property is located near the **Fourth Avenue Railroad** bridge, and has railroad connections with the **New York Central and Hudson River Railroad**, **New Haven and Hartford Railroad** and the **New York and Harlem Railroad**.

Parcel No. 1 and No. 2 are graded and in part ready for immediate occupancy. For full particulars, address "R.," P. O. Box 2180, New York City.

ROOT'S ILLUSTRATED HARDWARE PRICE BOOKS,

which were successfully introduced the past year, have been improved for 1885, by using extra heavy interleaved paper, with red ink down rulings, and by adding 84 extra unbound printed and illustrated pages pertaining to miscellaneous lines on which stock is very large, such as house hardware, and hardware intended for the trade. The 250 pages bound in the regular book, show mainly the lines on which all leading American hardware stocks agree, carefully selected in the interest of the merchant, from 21 different manufacturers, with 54 illustrations, many of them full size. Books sent on credit, charges prepaid, on receipt of the following

PRICES:

Each number has the same 239 printed and illustrated pages, large octavo, 6 $\frac{1}{2}$ x 9 $\frac{1}{2}$ inches. They differ only in single or double interleaving and binding.

No. 1 contains 478 pages, every other leaf of extra heavy interleaved paper, with red ink down rulings, and down rulings, which gives one fine ruled page for noting prices, in pencil, facing every printed page. Four short stubs are placed after each 10 pages, for pasting in other leaves, and new pages are inserted, with dark-colored genuine morocco leather flexible cover and flaps, with pocket inside the cover; also dark-red polished edges. **Price, 87 per copy.**

No. 2 like No. 1, but red Russia leather. **Price, 87 per copy.**

No. 3, like No. 1, but doubly interleaved, containing 478 pages, 478 of which are the extra heavy interleaving paper, with red ink down rulings, and down rulings, and two interleaved pages for noting prices instead of one. **Price, 87 per copy.**

No. 4, like No. 3, now about equals all the other numbers. **Price, 87 per copy.**

No. 5, like No. 1, but without flap or pocket. **Price, 87 per copy.**

No. 6, like No. 5, but without flap or pocket. **Price, 87 per copy.**

No. 7, like No. 1, but red imitation Russia leather. **Price, 87 per copy.**

No. 8, like No. 1, with lighter interleaving and without down ruling. A few copies are in stock, which will be closed out, including the 84 extra pages, at **Price 87 per copy.**

These prices give a house ordering six or more copies at one time.

In ordering, state if you prefer Tin, Wooden and Holman, or if you prefer the regular price book, which will be sent, including these lines. These Price Books are indispensable to hardware buyers, travelers and clerks, saving often \$100 to \$200 in time, and giving better satisfaction than those made in the ordinary way. Address orders to

T. W. ROOT, Detroit, Mich.

WHAT ARE YOU LOOKING FOR?

I have on hand a very large stock of New and Second-Hand Machinery, comprising ENGINES, Automatic and Slide Valve, BOILERS, Vertical and Horizontal, STEAM AND BELT PUMPS, STEAM ENGINE GOVERNORS, MACHINISTS' TOOLS, HOISTING ENGINES, WOOD-WORKING MACHINERY, STURTEVANT BLOWERS. Write and state your wants, and will send full particulars.

HENRY I. SNELL, M. E., 135 N. 3d Street.

PHILADELPHIA.

FOR SALE, CHEAP.

10 x 18 Corliss Engine, 200 H.P.

14 x 18 Corliss Engine.

14 x 22 Babcock & Wilcox Cut-Off Engine.

Upright Corliss Boiler, 80 H.P., with Smoke-Stack. Nearly new.

Horizontal Tubular Boilers, 50 H.P.

No. 3 L. H. Davis Boiler Pump.

800 feet 4-in. Cast-Iron Pipe, flanged.

D. B. CHUCKASHKAN, 243 Dyer St., Providence, R. I.

Manufacturing Plant for Sale, Cheap.

The property consists of 12 acres of land, with dam, flumes and buildings that are nearly new.

The water-power is never-failing, and abundant. The factories consist of

One Brick Building, 95 ft. x 36 ft., with L.

One Frame Building, 37 ft. x 17 ft.

One Frame Building, 37 ft. x 17 ft.

On the premises are Five Frame Tenements. A double track railroad siding runs to the factory doors, and has a few Fairbanks Track Scales. The plant has been used as a foundry and machine shop, but is adapted to any manufacturing where good power, good light and plenty of room are necessary. The location is near Hartford, and affords cheap transportation to all points at as low rates as any place in New England. The property will be sold at a very low price. For particulars, address "H. S."

No. 60 Walnut St., Hartford, Conn.

FOR SALE.

Reliable Water-Power and substantial Dam. Ship-ping facilities by canal and railroad unsurpassed. For particulars, address JAMES YOUNG, Middletown, Pa.

Wanted.

A practical man, with capital, to take general charge of a Car Manufacturing Company in active operation. Address D. T. PARKER, Anniston, Alabama.

Trade Report.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, February 25, 1885.

Scotch Pig.—The market is a little steadier. We quote makers' brands as follows:

Cotness, alongside, Glasgow.....	55/-
Langloan, " "	54/-
Gartsherrie, " "	53/-
Summerlee, " "	51/-
Carnbroe, " "	50/-
Glenarnock, Ardrossan.....	48/-
Eglinton, " "	48/-
Dalmellington, " "	46/-
Shotts, " at Leith.....	52/-

Lichterage from Ardrossan to Glasgow is 1 $\frac{1}{2}$ p

U. S. 4s, 1807, coupon.....	122 $\frac{1}{4}$	122 $\frac{1}{4}$
U. S. Currency 6s, 1805.....	125	—
U. S. Currency 6s, 1806.....	127	—
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The conjectures variously expressed in regard to an extra session of Congress and the perplexing state of the silver question are alike sources of disturbance. The Sundry Civil Bill, as reported to the House on Monday, contains a silver clause which may give rise to protracted debate, with uncertain results. The clause referred to provides:

"That the Secretary of the Treasury is hereby authorized, in his discretion, to suspend in whole or in part from July 1, 1885, to June 30, 1886, inclusive, the execution of so much of the act of February 28, 1878, as authorizes and directs the Secretary of the Treasury to purchase from time to time silver bullion to an extent not less than \$2,000,000 worth per month, nor more than \$4,000,000 worth per month, and which directs the coinage of the silver bullion so purchased into standard silver dollars, and which appropriates a sufficient sum of money from the Treasury to carry out the provisions of said act in these respects." The bank reserves are still running down, from which it is inferred that considerable amounts have been invested in various securities. The falling off within the last two weeks is nearly \$5,000,000. The surplus reserve now stands at \$49,712,850, against \$19,761,350 at the same time last year, and \$1,209,000 at the corresponding date in 1883. The loans show a loss this week of \$1,221,800, and there was a contraction of \$4,869,900 in deposits. Money is rather more active, with the drift of exchange in favor of this city. The abundance of money seeking employment was indicated by the continued purchase of sterling exchange for investment, the effect being to secure higher rates of interest by a transfer of balances to London. In the West the demand for money is small, but merchants, according to the Chicago Tribune, "generally expect a fair volume of exchanges in the spring, and a far better record as to sales and profits in 1885 than they had in 1884. The absence of bad failures is a feature that gives courage to many people who would not see any light so long as mercantile and financial concerns were dropping all around them."

In the general market, as already intimated, the snow embargo operates unfavorably. The absence of buyers noticed by dry-goods jobbers is felt to some extent in other departments, although the unprecedented low rates of railway fare favors buying in person rather than by mail or telegraph. It is remarked that since the opening of last November nearly 50,000 packages of manufactured cottons have been shipped to foreign countries, or nearly double the quantity of any corresponding period.

The imports of foreign merchandise at this port during the past week were \$1500 above those of the previous week, owing to the arrival of overdue steamers. The total was \$7,890,770, of which \$4,685,102 was general merchandise, and the remainder, \$3,205,668, dry goods. Since January 1 the total reaches \$55,510,278, compared with \$68,351,639 for the corresponding period of 1884. The imports of dry goods alone for the period last named were \$16,205,000, against \$23,108,000 for the same time in 1884. The export movement of domestic produce from this port continues on a very moderate scale, the total for the past week being \$5,417,915, against \$5,264,482 for the same week last year. Since January 1 they aggregate \$53,795,770, compared with \$18,505,367 for the corresponding period of 1884. According to the Custom House reports, the receipts of specie for the week were \$360,426, making a total of \$3,145,817 since January 1, and the exports of specie for the same time were \$566,338, making a total of \$5,213,109 since January 1.

Fisk & Hatch announce the discontinuance of business, preparatory to a dissolution of partnership. The Coffee Exchange will remove to the old Cotton Exchange building about May 1. Receiver Wilkinson, of the defunct Newark Savings Institution, has assets sufficient to have a surplus of \$80,000 after discharging all obligations.

B. G. Clark, President of the Thomas Iron Company, and Charles Dillingham have been appointed receivers of the Houston and Texas Central at the suit of the Southern Development Company.

The aggregate deposits of the savings banks of this State on January 1 were \$505,927,496, which is an increase of \$6,734,200 since January 1, 1884. One-third of the amount is invested in bonds and mortgages, one-third in United States bonds, one-quarter in municipal and State bonds, and the rest in real estate, cash and short loans. The total number of depositors is 1,165,174, and the average of deposits \$375.14. The average interest paid on deposits during the year was 3.44%.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, February 25, 1885.

The general quietness which has characterized all lines of trade for the past month still exists, but with less severity than a week ago. The movement of freight continues to be irregular both east and west of the city. Large quantities of goods from the East are yet detained between here and the Ohio River. In Northern Iowa, Ne-

braska, Minnesota and portions of Wisconsin the constant drifting of snow and continued cold makes the movement of teams an arduous task. Very little effort is made to move dead freight, and live freight at many places is refused. In the rural districts farmers are burning corn for fuel are not able to market their wheat; have no money, and therefore collections are slow and buying greatly interfered with.

Hardware.—The difficulty encountered in shipping and the general condition of the weather keep this market still in a depressed condition. The demand for Shelf Hardware for the season is fairly active, while that for Heavy Hardware and Railroad Supplies is steadily improving. No important change in price has occurred during the week.

Barb Wire.—The market has considerably strengthened since our last report, under the influence of the recent meetings of manufacturers. It is conceded that the demand for Barb Wire will be greatly in excess of stocks of spring trade. Manufacturers are not seeking orders, neither are they making quotations on anything except for immediate acceptance, and in all cases have withdrawn former prices. This has somewhat alarmed the consumer, and has given jobbers an opportunity of advancing their price $\frac{1}{4}$ %. They now quote 3 $\frac{1}{2}$ % @ 4 $\frac{1}{2}$ % for Painted and 1 $\frac{1}{2}$ extra for Galvanized in carload lots, and $\frac{1}{2}$ % off these prices for less than carload lots.

Nails.—The Nail market continues steady under the recent advance. The ruling quotation continues to be \$2.25, 2 $\frac{1}{2}$, 60 days, in carload lots, and \$2.30 for Steel, with 5% added for delivery from stock in small lots. One of the jobbers reports that they have 2500 kegs on the road, and it is their opinion that other jobbers have also stocks delayed. Nail mills in this locality report orders sufficient to keep them running for several months.

Ore.—Agents of Ore companies have been more active within the last week or 10 days. Furnace men are still dissatisfied with prices asked, and show no disposition to accept figures except through actual necessity. So far as can be learned prices have not yet been definitely settled, and considerable range is given to quotations in carload lots.

American Pig Iron.—Nothing of importance has occurred during the week. Prices continue to be fairly well supported for carload lots, which constitute the greater portion of the demand. Several contracts have been closed, one for 1000 tons of Lake Superior Charcoal, Nos. 1 and 2, equal to \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons, on private terms. Should a revival of business occur shortly the increased consumption will rapidly absorb the accumulated stock and give better tone to the market, which at present lacks buoyancy. Nos. 1 and 2 Lake Superior Charcoal Iron continue to be quoted \$20.50, four months, Chicago, and two others, aggregating from 700 to 1000 tons

Trade Report.

New York Iron Market

American Pig.—The market has been quiet and dull, without any features to distinguish it from its predecessors. There is no marked pressure to sell, except that possibly some outside Irons are offered at the usual range of concessions to tempo buyers. Some of the leading makers of Lehigh Irons are still trying to book orders. In the aggregate the small purchases made represent a fair trade. The representatives here of the Victoria Furnace, of Virginia, Messrs. H. W. Adams & Co., question the accuracy of the report circulated through the daily press that furnace has decided to blow out in consequence of an overstock. The report has very likely grown out of an misunderstanding due to the fact that probably mining has stopped in consequence of a large stock of ore. The furnace was carrying very little Pig Iron indeed. We continue to quote standard brands of Lehigh and North River Irons, tidewater delivery, as follows: No. 1 X Foundry, \$18 @ \$19; No. 2 X Foundry, \$17 @ \$18; Gray Forge, \$16 @ \$17. The outside figure is asked for special brands. Outside brands sell for 50¢ @ \$1 less than our quotations.

Scotch Pig.—Business has been very quiet. There is considerable Iron now afloat, but the bulk of it is sold. Nominal quotations for 5 and 10 ton lots are as follows: Coltness, \$21.50 to arrive; Gartsherrie, \$21 to arrive, \$22 from yard; Shotts, \$21.50 to arrive, \$22 from yard; Langloan, \$21.50 to arrive, \$22 from yard; Carnbroe and Glengarnock, \$19.50 to arrive, and \$20.50 from yard; Summerlee, \$20.50 to arrive; Dalmellington, \$19 @ \$19.25 to arrive; Eglinton, \$18.50 @ \$19 to arrive; Clyde, \$19 @ \$19.25 to arrive. On large lots concessions are made.

Bessemer Pig and Spiegeleisen.—There has been no business of any consequence either in Bessemer Pig or Spiegeleisen. We quote the latter, nominally, \$25.50 @ \$26 for 20%, and \$30 for 30%.

Bar Iron.—Some of the mills have full work and are consequently little inclined to meet buyers' views. Others are eager for orders, so that there is little difficulty in covering requirements at current rates. There is a good deal of complaint of a growing practice of selling what is really Common Iron for Refined Bar, consumers evidently being tempted by the low figures. Well-known grades of Refined Bar are not selling below our quotations, which are represented by the following range: Common Iron at mill, 1.4¢ @ 1.6¢; from store, 1.6¢ @ 1.9¢; Best Refined at mill, 1.65¢ @ 1.9¢; from store, 1.9¢ @ 2¢.

Structural and Shaped Iron.—The details of the arrangements among the Beam manufacturers were completed last week. The association now includes all of the makers, Messrs. Jones & Laughlin, of Pittsburgh, having joined some weeks ago. The St. Paul bridge, referred to in our last issue, was secured by the Passaic and the Edgemont works, the quantity required being about 1000 tons. Altogether, there is a good deal of work of this kind pending, among others being a bridge for the city of Boston, which will call for \$250,000 worth of Iron-work. Quotations for small lots continue to be nominally as follows: Angles, from mill, 2.1¢ @ 2.15¢; from store, 2.3¢ @ 2.6¢; Tanks, from store, 2.8¢ @ 3¢. Beams and Channels are 3¢ on dock for all orders.

Plates.—Business continues very quiet indeed, transactions being on a moderate scale. Usual prices of Iron Plates are as follows: Common or Tank, 2.2¢ @ 2.3¢; Refined, 2.5¢; Shell, 2.5¢ @ 2.5¢; Flange, 3.5¢; Extra Flange, 4¢ @ 4.5¢; Tank and Bridge Plate from mill, 2.05¢ @ 2.1¢. For small lots of Steel Plates the quotations are as follows: Ship, 2.4¢ @ 3¢ at mill; Tank, 3¢ @ 3.5¢ on dock; Boiler, 3.5¢ @ 3.5¢ for Shell, 4¢ @ 4.5¢ for Flange, and 4.5¢ @ 5.5¢ for Extra Flange and Fire-box.

Sheet Iron.—The season for some classes of buyers has not yet set in and the market is still dull. We quote prices of Sheet Iron in our list of New York Wholesale Metal Prices.

Merchant Steel.—A fair quantity of Steel is selling from warehouse at figures which are somewhat irregular: Nominal quotations are as follows: American Tool Steel, 8¢ @ 9.5¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; Crucible Machinery, 4.5¢ @ 6¢; Spring and Tire, 2.5¢ @ 3.5¢; Open-Hearth and Bessemer Machinery, 2.5¢ @ 3¢; English Tool, 13.5¢ @ 15¢.

Steel Rails.—We do not hear of a single transaction, and even small lots do not appear on the market. Nominal quotations vary between \$27 and \$28 at mill. In the absence of any business, it is impossible to judge whether and to what extent the lower figure would be shaded for large lots.

Steel Wire Rods.—Nothing has occurred to dispel the dullness, and Foreign Rods are still nominally quoted \$43 for the better qualities, though it is probable that concessions would be made for round lots.

Old Rails.—We are reported two or three sales of fair lots, one of them for delivery at a point in the western part of this State. The price named in one of these lots was low. We quote \$16.50 @ \$17.

Scrap Iron.—The market has been quiet, but firmer. We quote from yard \$18 @ \$18.50.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., Philadelphia, February 24, 1885.

The week's business shows some improvement, nevertheless, and the outlook is more encouraging than it has been for some time past. Prices are unchanged, however, and remain as last quoted, viz.: 2¢ @ 2.1¢ for Angles, 2.1¢ @ 2.15¢ for Bridge Plate, 2.5¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—The demand for Thin Sheets is very limited and prices much the same as they have been for several weeks past, irregular and unsatisfactory. Thick Sheets are doing a little better, orders being of a more general character than usual, showing a very fair consumption in some quarters. Small lots are quoted at about the following figures:

Best Refined, Nos. 26, 27 and 28	31¢
Best Refined, Nos. 18 to 25	31¢
Common, 1¢ less than the above	31¢
Best Bloom Sheets, Nos. 26 to 28	5.5¢
Best Bloom Sheets, Nos. 22 to 25	4.5¢
Best Bloom Sheets, Nos. 16 to 21	4¢
Blue Annealed	2.5¢
Best Bloom, Galvanized, discount	57¢
Second quality, discount	60¢
Common, discount	62¢

The week's business shows some improvement, nevertheless, and the outlook is more encouraging than it has been for some time past. Prices are unchanged, however, and remain as last quoted, viz.: 2¢ @ 2.1¢ for Angles, 2.1¢ @ 2.15¢ for Bridge Plate, 2.5¢ for Tees, and 3¢ for Beams and Channels.

Wrought-Iron Pipe.—The demand is improving, and the indications in that respect are rather encouraging. Prices show no improvement, however, and discounts vary according to circumstances, although the ordinary rates are as follows: Butt-Welded Black Pipe, 50%; Butt-Welded Galvanized, 35%; Lap-Welded Black, 67½%; Galvanized, 45%; Boiler Tubes, 60%.

Steel Rails.—A little more activity is reported, but prices are still very irregular. In ordinary cases about \$27.50 at mill is quoted, but on large lots and favorable dates for delivery \$27 would be accepted, and possibly less, by mills that are not well supplied with orders. Price depends upon circumstances, and it is difficult to do anything more than give a general idea of the market, unless accompanied by full details of each transaction, which is obviously impossible.

Crop Ends.—There is not much demand, although English Crops could be had for shipment at \$18 @ \$18.50, and Welsh at from \$17 to \$17.50.

Old Rails.—There is more inquiry, but owing to scarcity no business has been done for some time. Holders ask \$17.75 @ \$18 for shipments from Southern ports, with bids of \$17 @ \$17.25 for 1000-ton lots. Bull Heads are offered at \$20, with bids of \$18.50 on 1000-ton lots. The market has a firm tone, and appearances indicate that buyers will advance their bids, as Rails are wanted in several directions. For deliveries in the interior \$18.50 @ \$19 asked, with bids slightly below those figures.

Old Material.—The tone of the market is improving, and prices are firm at last week's quotations, according to quality, point of delivery, &c.: No. 1 Wrought Scrap, \$17 @ \$18; No. 2 do., \$18 @ \$13; Horse Shoes, \$22 @ \$22.50; Turnings do., \$13 @ \$14; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$15.50 @ \$16; Fish Plates, \$22; Cast Scrap, \$13.50 @ \$14; do. Turnings, \$9.50 @ \$10.

Nails.—There is no change in prices, which are steady at \$2.30. Stocks are unusually light, and firm, if not higher, prices appear to be assured for some time to come.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Avenue, Pittsburgh, Pa., February 24, 1885.

There has been little or no change in the general business situation during the past week, but in some respects the outlook is favorable for an early improvement. The extremely cold weather tends to curtail business. Traffic and travel throughout the Northwest are still badly impeded by the snow and ice, and while this continues no improvement in the demand for manufactured goods can be expected.

There has been nothing important developed in labor matters during the week; the situation is unsettled and unsatisfactory, and there is still an army of unemployed men hereabouts. Conventions of the several districts of the Amalgamated Association will be held on April 4, when delegates will be elected to the scale convention which meets in this city on April 15. At both of these conventions the wage question will be the leading topic of discussion. At the last-named convention a conference committee will be appointed to confer with a similar committee of manufacturers in regard to the scale to be paid Ironworkers the coming year. What the outcome of this conference will be is difficult at present to foretell, but it appears to be pretty generally conceded that there will be a reduction.

Messrs. Graff, Bennett & Co., who got into trouble a couple of years ago, and asked for and obtained an extension, after paying 40% of their indebtedness have been obliged, owing to the continued depression in the Iron business, to ask for an extension on their next payment, now about due, and it will no doubt be granted. In regard to the Oliver Bros. & Phillips matter there is nothing new to note. The extension, it is said, has been obtained.

Natural-gas accidents are still of frequent occurrence, and a pretty strong feeling is being developed against the general introduction of the gas into the city. Those, however, who are well informed on the subject claim that the natural is no more dangerous than the artificial gas, and that the accidents have been the result of poor pipe and inferior workmanship. Some of the pipe laid is being taken up and replaced with a better article, and a good deal more care is being taken in the work.

Wrought-Iron Pipe.—The demand continues light, and is chiefly for small lots, but an increased business is confidently looked for just as soon as the weather moderates so that outside work can be resumed. Prices remain unchanged, and it is believed they are as low as they are likely to go. Discounts on Black Butt-Welded Pipe, 1½-inch and smaller sizes, 47½%; Galvanized do., 40%; Black Lap-Welded, 1½-inch and larger sizes, 65 @ 67½%; Galvanized do., 47½ @ 50%; Selected Pipe, or Pipe cut to specified lengths, discount 5% less than the rates above quoted. Discount on Boiler Tubes, 60%; 2-inch Oil-well Casing, 11½' per foot, net; 5½-inch Oil-well Casing, 37½ @ 38½' per foot, net.

Steel.—The Merchant Steel trade is reported more active, but no improvement in prices. Standard brands Refined Cast Steel, 9¢; do. Crucible Machinery, 4.5¢; do. Open-hearth and Bessemer, 3¢. Steel Nail Slabs, \$30 per ton, free on cars at works.

Steel Rails.—Continue very dull here, but it is hoped that there will be an improved demand within a few weeks. Heavy Sections, in the absence of sales, may be quoted at \$26.50 @ \$27, cash, at works. A mill at Chicago sold 5000 tons recently at \$29.25, cash, there, which is equal to about \$26.75 per ton.

Old Rails.—There has been a good deal of inquiry within the past week or two for Old Iron Rails for immediate delivery, and with a very scant supply prices are higher. The Fort Wayne Railroad Company are reported as having sold a lot to Youngstown mill at \$20.25, delivered there. For future delivery there are no buyers here that we can

hear of above \$18, at which price 500 tons were sold for March two weeks ago; this sale, as we understand, gives the seller the option of all the month to fill his contract. Old Steel Rails are still quoted for immediate delivery at \$15.50 @ \$16.50, according to length.

Crop Ends.—Steel Rail Ends are in small supply, and for a present delivery may be quoted at \$17.50 @ \$18. Steel Bloom Ends, \$17 @ \$17.50.

Railway Track Supplies.—There is but little inquiry and prices remain nominally unchanged. Spikes, 2¢, 30 days, delivered. Splice Bars, 1.6¢ @ 1.7¢; Track Bolts, 2.35¢ @ 2.4¢ with Square and 2.6¢ @ 2.65¢ with Hexagon Nuts.

Scrap.—No. 1 Wrought Scrap, \$16 @ \$17, net ton; Old Car Axles, \$24 @ \$25; Wrought Turnings, \$13 @ \$14; Cast Ironings, \$11 @ \$12; Old Car Wheels, \$15 @ \$16.

Chattanooga.

Office of *The Iron Age*, Carter and Ninth Sts., Chattanooga, February 23, 1885.

The past week has developed a very encouraging feeling among our furnace owners. Nearly all the product of our furnaces is taken up on orders for the next three months, at prices at which most of them are making money, but they feel indisposed to make any more contracts at present figures. Actual offers are being made to take entire products up to July 1 at present rates, and \$1 additional is the figure very freely discussed as the asking price for contracts after February 1. The fact is, most of the furnaces now running are making some money over the actual cost of production, and the outlook is of such a character that a much more hopeful feeling prevails. Notwithstanding some discouraging reports from the Pig Iron market centers, the orders and inquiries are of such a character as to justify our people in looking for better times during the present year. Some of the Southern furnaces have taken advantage of the present prices and contracted for a six months' supply, while others are ordering only from week to week. Inquiries from the East continue to be frequent, which clearly shows that they are looking to this district for a regular supply of a portion of their wants. During the next four months two of our large furnaces will go out and be thoroughly overhauled, which will probably improve both the quality and quantity of their product. Our railroads continue to be loaded down with freight, and much complaint is being made at the delays which in some cases are very annoying. Many of our manufacturers are running at their full capacity, and nearly all are running on fair time. The lumber business continues very brisk and the mills are running full.

Muck Bar.—There is no improvement in the demand, and in the absence of sales we repeat former quotations, \$27 @ \$27.50, cash.

Manufactured Iron.—The demand for all kinds of Finished Iron continues exceedingly light for the season, and no improvement can reasonably be expected as long as the Northwest is frozen and snowed up, as it has been the greater part of the winter. It is probable that after the weather moderates so that railway traffic can be resumed and outside work commenced there will be an improved demand. Prices are still quoted on a basis of 1.65¢ @ 1.75¢ for Bars, 60 days, 2¢ off for cash. These quotations are for first-quality Iron.

Nails.—The demand has fallen off within the past two weeks, as it was expected it would, in view of the recent sharp advance in prices. Large Western and Southern buyers are now holding off to ascertain whether the advance is likely to be maintained. So far as we can learn, manufacturers are holding firm, and the indications are that the break anticipated by many of the jobbers will not take place. We repeat former quotations, \$2.25, 60 days, 2¢ off for cash, with rebate of 10¢ per keg on carload lots and upward. Manufacturers of Steel Nails continue very confident that the Steel is destined to supersede the Iron Nail.

Wrought-Iron Pipe.—The demand continues light, and is chiefly for small lots, but an increased business is confidently looked for just as soon as the weather moderates so that outside work can be resumed. Prices remain unchanged, and it is believed they are as low as they are likely to go. Discounts on Black Butt-Welded Pipe, 1½-inch and smaller sizes, 47½%; Galvanized do., 40%; Black Lap-Welded, 1½-inch and larger sizes, 65 @ 67½%; Galvanized do., 47½ @ 50%; Selected Pipe, or Pipe cut to specified lengths, discount 5% less than the rates above quoted. Discount on Boiler Tubes, 60%; 2-inch Oil-well Casing, 11½' per foot, net; 5½-inch Oil-well Casing, 37½ @ 38½' per foot, net.

Hardware.—The continuation of very disagreeable weather has caused a continued depression in this business. Snow and rain do not form an agreeable condition of weather in which to do much outside work, and very little building or farming has been done; but this will soon change, as the time of year is near at hand when both of these branches of business generally open with a boom. As a general thing, most of our jobbing houses are well stocked with every thing that is likely to be required.

Barbed Wire.—This is an article that is growing very much in favor through the South, and the factory here is having all it can do. **Railroad Fastenings.**—The demand for these continue good, and the works are running full on orders that will keep them going some time. We quote: Spikes (standard), 1.8¢; Splices, 1.7¢, and Bolts, 2.30¢.

Scrap.—There are no movements in Old Material, with the exception of Old Rails, which are selling at \$16 @ \$16.25 where sales are affected at all. These prices cannot, however, be had when shipments would have to be made a long distance.

Ores and Coke.—In these articles there is no change to note. Occasionally a new opening is made, and the product is immediately taken at the regular prices.

Cincinnati.

FEBRUARY 23, 1885.—**Pig Iron.**—The past week has developed no new features in the market; the stormy and cold waves con-

tinue to interrupt both trade and shipments throughout the West. The greater portion of the Irons sold by Cincinnati dealers is delivered to consumers at all points direct from the furnaces in Maryland, Virginia, Tennessee, Alabama, Kentucky, Ohio, Michigan and Pennsylvania, and at prices in all cases less the freight to Cincinnati on the quotations below. Many of these Irons can be laid down to consumers at less than quotations in the Cincinnati market:

CHARCOAL FOUNDRY.

Hanging Rock, No. 1..... \$20.00 @ 21.00
Hanging Rock, No. 2..... 19.00 @ 20.00
Tennessee and Alabama, No. 1..... 18.00 @ 19.00
Tennessee and Alabama, No. 2..... 16.00 @ 17.00
Lake Superior, Nos. 2 and 3 and 4..... 21.00 @ 22.00

COKE FOUNDRY.

Ohio and West Pennsylvania, No. 1..... 18.00 @ 19.00
Ohio and West Pennsylvania, No. 2..... 16.50 @ 17.50
Virginia, Tennessee and Alabama, No. 1..... 16.00 @ 17.00
Virginia, Tennessee and Alabama, No. 2..... 14.50 @ 15.50

SILVER-GRAY SOFTENERS.

Hanging Rock (Jackson County), No. 1..... 18.00 @
Hanging Rock (Jackson County), No. 1 B..... 17.50 @
Hanging Rock (Jackson County), No. 2..... 16.50 @ 17.00
Hanging Rock (Jackson County), No. 3..... 16.00 @
Other makes, No. 1..... 16.00 @
" No. 2..... 15.00 @

CAR-WHEEL.

Hanging Rock Cold-blast Charcoal..... 26.00 @ 28.00
Virginia Cold-blast Charcoal..... 27.00 @
Tennessee and Alabama Warm-blast Charcoal..... 24.50 @ 25.00
Hanging Rock Warm-blast Charcoal..... 30.00 @ 21.00

FORGE.

Charcoal..... 16.00 @ 19.00
Coke and Stonecoal..... 14.00 @ 15.00
No sales Scrap reported.

Louisville.

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 115 to 121 West Main street, Louisville, under date of February 23, 1885, report as follows: Trade for the past week has been dull, largely owing to the extreme cold weather. Orders have been for small lots, confined to actual wants only. There has been no change to note in the price of Bar Iron since our last report. Prices are firm. Nails continue in good demand at the late advance. The weather has been so continuously cold that very little has been done in the building line since the winter set in. Trade in agricultural goods—Hoes, Rakes, Corn Planters, &c.—has opened up and will doubtless be of large proportions from present indications. Barb Wire is firm and sales are fair. This season will, we think, see increased sales over those of last. Farmers are gradually becoming convinced that this is the only economical fencing. The river has been closed by ice for some days past, and there is no immediate prospect of resumption of navigation.

GEORGE H. HULL & Co., of Louisville, report to us as follows, under date of February 23, 1885: The market continues quiet; sales moderate. We quote for cash in round lots as below:

PIG IRON.

Southern Coke, No. 1 Foundry..... \$16.50 @ 17.50
" No. 2..... 15.50 @ 16.50
Hanging Rock Coke, No. 1 Foundry..... 15.00 @ 17.00
Hanging Rock Charcoal, No. 1 Foundry..... 21.00 @ 21.50
Southern Charcoal, No. 1 Foundry Silver Gray, different grades..... 15.00 @ 16.00
Southern Coke, No. 1 Mill, Neutral..... 15.50 @ 14.50
" No. 2 " Cold-blast..... 13.00 @ 13.50
Southern Charcoal, No. 1 Mill..... 16.00 @ 17.00
White and Mottled, different grades Southern Car-Wheel, standard brands..... 25.00 @ 26.00
Southern Car-Wheel, other brands..... 24.00 @ 22.00
Hanging Rock, Cold-blast..... 24.00 @ 25.00
" Warm-blast..... 20.00 @ 21.50

Imports and Exports.

IMPORTS.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending Feb. 24, 1885:

Hardware.

Alexander F. & Sons, Cases, 5
Wheel, 1
Machinery, ca. 1
Berbecker J. & Co., Cases, 15
Brooklyn Lice Mfg. Co., Machinery, ca. 5
Boker Hermann & Co., Hardware, cutlery, and guns, pkgs., 25
Calhoun, Robbins & Co., Case, 1
Davis, Turner & Co., Packages, 4
Downing R. F. & Co., Cases, 27
Field Alfred & Co., Cutlery, ca. 5
Cask, 1
Case, 8
Guns, case, 1
Chains, cks, 9
Folsom H. & D., Arms, ca. 3
Gordon Otto, Packages, 335
Cases, 2
Gnade & Huntington, Mach'y, case, 1
Gurney Fred, B., Case, 1
Graef Cutlery Co., Cutlery, ca. 10
Haynes C. A., Cutlery, case, 1
Mdse., ca. 15
Lang W. Bailey, Cranks, pins, 6
Loewi Edgar, Case, 2
Lyon W., Rollers, cks, 17
Mills & Gibb, Case, 1
Murphy Alex. & Co., Mach'y, ca. 5
Mdse., ca. 20
Noyes S. & Co., Cases, 4
Ranford, Nails, ca. 40
Schover, Daly & Gales, Mdse., ca. 9
Cases, 7
Shattuck & Binger, Nails, bags, 500
Taylor Thos., Cases, 49
Theon John & Co., Cases, 2
Von Cleff & Co., Mdse., ca. 17
Ward Oliver, Cutlery, ca. 4
Webusch, Higer & Co., Cases, 19
Anvils, 418

Iron.

Baring Bros. & Co., Wire rods, coils, 811
Blooms, 32
Brockner & Evans, Wire netting, rolls, 160
Brown Bros. & Co., Coils, 627
Bull, 1
Carr & Moon, Wire rods, coils, 380
Coddington T. B. & Co., Sheets, bds., 819
Cortis R. J., Wire rope, coils, 4
Crocker Bros., Pigs, tons, 100
Spikes, tons, 339
Downing R. F. & Co., Pigs, tons, 100
Lang W. Bailey, Bars, 79
James James & Co., Pig, tons, 100
Mason John W. & Co., Wire rope, coils, 9
Naylor & Co., Rods, coils, 2509
Pierces & Co., Rods, bds., 160
Wire, ca. 1985
Stetson Geo. W. & Co., Pig, tons, 100
Williamson Jas. & Co., Pigs, tons, 200
Wilson & Willoughby, Ironwork, case, 1
Order, Wire rods, coils, 6899
Sheets, bds., 160
Rod, 8422
Pigs, tons, 100
Rods, coils, 11,296
Wire rods, pkgs., 1758
Wire drawing plates, case, 1
Steel.

Abbott Jere & Co.

Cases, 49
Barker Bros. & Co., Wire rods, 4766
Boker Carl F., Cases, 7
Crab W. & Co., Wire, bds., 20
Dolge Alfred, Wire cks, 3
Dolge Alfred, Wire cks, 3
Downing R. F. & Co., Cases, 49
Packages, 48

Ivison W. F., Packages, 75
Moss F. W., Bundles, 25
Bars, 17
Tomlinson Spring Co., Bundles, 40
Wagner W. F., Bundles, 101
Bars, 25
Cases, 15
Order, Plates, cks, 5
Forgings, 29
Wheels, 8
Sheet-ware, cs, 2
Cases, 17
Rods, bds., 23

Metals.

Bache Semon & Co., Tin foil, cs, 104
Baring Bros. & Co., Tin plates, bxs., 805
Balsette & Co., Old copper, lhdss., 24
Bruce & Cook, Tin plates, bxs., 1828
Crooks Robert & Co., Tin plates, bxs., 3667
De Witt H. R. & Co., Tin plates, bxs., 200

The imports of Hardware, Cutlery and Metals for the week ended February 20 were as follows:

Dickerson, Van Dusen & Co., Tin plates, bxs., 1176
Erie and Gt. West. Dis. Co., Tin plates, bxs., 500
Fraser Jas., Type metal, ingots, 1
Hunt John, Lead pipes, cks., 11
Macy's Sons J., Zinc oxide, bds., 50
Naylor & Co., Speffer, plates, 100
Philips Dodge & Co., Tin plates, bxs., 8099
The Faggers, bxs., 398
Anthony, cks, 20
Reid John, Sinks, pkgs., 102
Thompson A. & Co., Tin plates, bxs., 450
Wittenberg Bros., Metallic caps, cs, 412

Order, Spelter plates, 2035
Tin plates, bxs., 24,211
Quicksilver, bxs., 100
Tin, ingots, 1320
Tin, slabs, 2145
Tin plates, bxs., 1632
Antimony, cks, 200
Tin, bxs., 5

The imports of Hardware, Cutlery and Metals for the week ended February 20 were as follows:

Quantity, Value

Brass goods..... 20 \$1,614
Bronzes..... 5 375
Chains and anchors..... 26 1,180
Copper..... 18 1,329
Cutlery..... 95 331
Guns..... 30 2,738
Hardware..... 8 940
Iron, pig, tons..... 692 12,549
Iron, sheet, tons..... 19 1,413
Iron, ore, tons..... 275 908
Iron, other, tons..... 735 34,501
Plates, cks, 100
Metal goods..... 57 4,165
Nails..... 382 55,735
Needles..... 1 7
Old metal..... 19 5,649
Platinum..... 2 3,980
Platedware..... 7 330
Pins..... 6 458
Plumbago..... 28 404
Quicksilver..... 250 7,642
Regulus antimony..... 100 5,649
Saddlery..... 6 758
Steel..... 130,621 241,362
Tin, boxes..... 60,098 241,362
Tin, slabs, 1343 102,334
Wire..... 460 5,023
Zinc, oxide..... 300 2,077

The comparisons with previous dates is as follows:

For the 8 weeks same

week of 1885, time 1884

Cutterly, pkgs..... 95 639
Hardware, pkgs..... 8 127
Iron, R. B., bars..... 1 2,920
Lead, pigs..... 4,988 8,661
Steel, pkgs..... 120,621 337,490 103,543
Tin, bxs..... 60,068 198,904 223,287
Tin slabs, lbs..... 122,334 1,460,462 3,089,671

EXPORTS.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the Port of New York, for the week ending February 24, 1885:

Dutch West Indies.

Quantity, Val.

Mf. iron, pkgs..... 5 24
Ptln., gals....10,950 95

British Australia.

Quantity, Val.

Rifles, cs. 2 100

British Guiana.

Quantity, Val.

Mach'y, pkgs. 1 16

Buckles, case. 1 24

Sew. ma., cs. 9 244

Nails, cs. 2 10

New Brunswick.

Quantity, Val.

Ptln., gals....15,800 1,670

Hdw., cs. 1 16

British Possessions in Africa.

Quantity, Val.

Rifles, cs. 2 100

British East Indies.

Quantity, Val.

Bordeaux.

Quantity, Val.

Copper, cks. 90 13,000

Copper, cks. 257 6,500

Dunkirk.

Quantity, Val.

Hdw., cs. 27 731

Amsterdam.

Quantity, Val.

Tinware, cks. 6 508

Antwerp.

Quantity, Val.

Cutterly, cks. 125 75

Clock, cks. 1 16

Gas.

Quantity, Val.

Gas, cks. 1 16

Glasgow.

Quantity, Val.

Gas, cks. 2,422 1,471

S. rollers, cs. 6 147

Mach'y, pkgs. 6 625

Dublin.

Quantity, Val.

Hdw., cs. 1 471

London.

Quantity, Val.

Hdw., pkgs. 43 4,760

London.

Quantity, Val.

Hdw., cs. 1 471

Huy.

Quantity, Val.

Hdw., pkgs. 35 570

Cutterly, cks. 134 315

Mf. iron, pkgs. 4 644

Clock, cks. 2 302

Gas, cks. 1 56

Mf. iron, pkgs. 6 604

Cartridges, cse. 1 33

British Possessions in Africa.

Quantity, Val.

Ptln., gals....456,150 43,054

Bordeaux.

Trade Report.

General Hardware.

There is an increased amount of business doing this week, and many goods are selling in small assorted orders, which come for the most part through travelers or the road, or by letter direct from the customers. The severe winter weather to which we referred in our last issue as holding back orders still continues, and, as it interferes seriously with business, the expectation is expressed that with the approach of spring and moderate weather there will be a decided movement in trade. There may not be grounds apparent to justify the hope of an exceptionally heavy season's business, but the opinion is expressed by experienced and judicious Hardwaremen that the trade, though late, will be fairly satisfactory in volume. At this juncture it is especially important that manufacturers hold firmly to their prices, and that their customers among the jobbers refrain from underselling them too freely. There are many leading lines which at present are held at very low figures which could probably soon recover tone if this suggestion were acted upon.

NAILS.

The market is firmer, and manufacturers continue to decline to sell at lower figures than \$2.20. They are still, however, delivering Nails on old orders at lower figures, and the Nails referred to in our last issue as selling at lower rates came from second hands, content to realize at a shade under current rates. This movement has lost much of its force, and the market is therefore in a firmer condition. It has not, however, spent all of its force, and it might be possible, by carefully going over the market, to shade \$2.20 a little for large lots. There are some export orders on the market which have not, however, been placed as yet. Steel Nails are quoted \$2.25 at mill, 10 per cent. off.

BARB WIRE.

One of the leading manufacturers in this market reports that he is now behind his orders at least 10 days. The open market continues quiet, with quotations unchanged at 5¢ @ 5¢ for small lots of Galvanized Four Point Wire. This market, in contradistinction to the Western trade, takes Galvanized Barb Wire almost exclusively, a fact due to the more rapidly destructive effects of our Eastern climate. It is reported that the negotiations between Washburn & Moen and the unlicensed manufacturers are progressing favorably. From the West come indications of a stiffening in the market for Plain Wire, which, if carried further, would soon tell on the prices of Barb Wire.

AUGERS AND BITS.

Manufacturers refer to the present condition of the market as exceedingly unsatisfactory in the price these goods are commanding, and some of them advise us that, as Augers and Bits cost more than their price at 70 per cent. discount, they will either refuse to meet this figure entirely, or curtail the production until more satisfactory prices prevail. Most of the Auger and Bit manufacturers, it is said, can afford to close their shops till such time as their goods will bring profit, some, indeed, having practically closed already. On the other hand, there is no doubt that Augers and Bits can readily be purchased at discount 70 per cent., with concessions on large lots. A manufacturer refers to the fact that jobbers seem to think that, if Steel falls off a certain percentage in price, finished goods should decline in the same proportion, and this he alludes to as having a tendency to weaken prices. He then calls attention to the fact that the raw material forms are a very minute proportion of the cost of these goods, labor being the principal item, which in this line is referred to as being about as high as it has been, while taxes, insurance and running expenses remain unchanged. Hence, he remarks, the reduced cost of raw material makes a very small percentage of difference in the cost of the finished goods.

The Snell Mfg. Co., Fiskdale, Mass., for whom Bates, Wilson & Co. are agents, 204 Broadway, New York, are putting on the market a Bit stamped "Bates," which is intended to compete with the low-priced goods which are made by other makers. This Bit they offer at a discount of 70 and 10 per cent. They allude to these Bits as good, honest goods, which will be found in quality equal to those of other makers, and as differing principally from the Snell Bits in the fact that they are not so finely finished. The company, in offering this cheaper Bit, desire to meet the demand of the trade for an article of this character, without in any way impairing the quality or reducing the price of the Snell goods. These are firmly held, we are advised, at discount 60 and 10 and 5, beyond which figure they refuse to make any concessions.

MISCELLANEOUS PRICES.

The Gautier Steel Department of the Cambria Iron Company, Johnstown, Pa., give notice to the trade withdrawing all quotations of prices on Steel and Wire of every description.

On page 32 the Bemis & Call Hardware and Tool Company, Springfield, Mass., advertise their new No. 3 Patent Pipe Wrench, of which we have recently given a description. This article is sold regularly at a discount from the list of 35 and 5 per cent.

The Chadborn & Coldwell Mfg. Co., Newburgh, N. Y., who are widely known as manufacturers of the Excelsior Lawn Mowers, are making quite extensively Chadborn's Automatic and Smoked-Beef Cutter, which is listed at \$72 per dozen, subject to a discount of 5 per cent.

The following is the price list of the Diamond Ventilator, which is manufactured by the Diamond Ventilator Company, John M. Ayer, Chicago:

	Per doz.
No. 1 Ventilator, 1½-inch, opening any length under 3 inches	\$12.00
No. 2 Ventilator, 2½-inch, opening any length under 3 inches	24.00
No. 3 Ventilator, 3½-inch, opening any length under 3 inches	36.00
No. 4 Ventilator, 4½-inch, opening any length under 3 inches	48.00
No. 5 Ventilator, 5½-inch, opening any length under 3 inches	60.00
No. 6 Ventilator, 6½-inch, opening any length under 3 inches	72.00
No. 7 Ventilator, 7½-inch, opening any length under 3 inches	84.00
No. 8 Ventilator, 8½-inch, opening any length under 3 inches	96.00
No. 9 Ventilator, 9½-inch, opening any length under 3 inches	108.00
No. 10 Ventilator, 10½-inch, opening any length under 3 inches	120.00
No. 11 Ventilator, 11½-inch, opening any length under 3 inches	132.00
No. 12 Ventilator, 12½-inch, opening any length under 3 inches	144.00
Above No. 12 or 12 inches special price, according to diameter and length.	

Discounts from the above list are regulated according to the quantity of goods purchased, as follows, there being a further discount of 2½ per cent. for cash within 10 days after invoice date:

Orders for any part of one gross, any size	22½%
Orders for one gross, any size	21%
Orders for two gross, any size	20%
Orders for three gross, any size	19%
Orders for four gross, any size	18%
Orders for five gross, any size	17%

The following is the recently-revised price list for the Triumph Sash Lock, manufactured by the Morris Sash Lock Mfg. Co., Cincinnati, Ohio. It will be perceived that there is a change in the list price of No. 21. The list is subject to a discount of 60 per cent.:

No.	Plain Iron, Jappanned, with Iron Rivet	Plated Rivet and Drop
No. 20	\$1.50	2.00
No. 21	1.50	2.00
No. 22	1.50	2.00
No. 23	1.50	2.00
No. 24	1.50	2.00
No. 25	1.50	2.00
No. 26	1.50	2.00
No. 27	1.50	2.00
No. 28	1.50	2.00
No. 29	1.50	2.00
No. 30	1.50	2.00
No. 31	1.50	2.00
No. 32	1.50	2.00
No. 33	1.50	2.00
No. 34	1.50	2.00
No. 35	1.50	2.00
No. 36	1.50	2.00
No. 37	1.50	2.00
No. 38	1.50	2.00
No. 39	1.50	2.00
No. 40	1.50	2.00
No. 41	1.50	2.00
No. 42	1.50	2.00
No. 43	1.50	2.00
No. 44	1.50	2.00
No. 45	1.50	2.00
No. 46	1.50	2.00
No. 47	1.50	2.00
No. 48	1.50	2.00
No. 49	1.50	2.00
No. 50	1.50	2.00
No. 51	1.50	2.00
No. 52	1.50	2.00
No. 53	1.50	2.00
No. 54	1.50	2.00
No. 55	1.50	2.00
No. 56	1.50	2.00
No. 57	1.50	2.00
No. 58	1.50	2.00
No. 59	1.50	2.00
No. 60	1.50	2.00
No. 61	1.50	2.00
No. 62	1.50	2.00
No. 63	1.50	2.00
No. 64	1.50	2.00
No. 65	1.50	2.00
No. 66	1.50	2.00
No. 67	1.50	2.00
No. 68	1.50	2.00
No. 69	1.50	2.00
No. 70	1.50	2.00
No. 71	1.50	2.00
No. 72	1.50	2.00
No. 73	1.50	2.00
No. 74	1.50	2.00
No. 75	1.50	2.00
No. 76	1.50	2.00
No. 77	1.50	2.00
No. 78	1.50	2.00
No. 79	1.50	2.00
No. 80	1.50	2.00
No. 81	1.50	2.00
No. 82	1.50	2.00
No. 83	1.50	2.00
No. 84	1.50	2.00
No. 85	1.50	2.00
No. 86	1.50	2.00
No. 87	1.50	2.00
No. 88	1.50	2.00
No. 89	1.50	2.00
No. 90	1.50	2.00
No. 91	1.50	2.00
No. 92	1.50	2.00
No. 93	1.50	2.00
No. 94	1.50	2.00
No. 95	1.50	2.00
No. 96	1.50	2.00
No. 97	1.50	2.00
No. 98	1.50	2.00
No. 99	1.50	2.00
No. 100	1.50	2.00
No. 101	1.50	2.00
No. 102	1.50	2.00
No. 103	1.50	2.00
No. 104	1.50	2.00
No. 105	1.50	2.00
No. 106	1.50	2.00
No. 107	1.50	2.00
No. 108	1.50	2.00
No. 109	1.50	2.00
No. 110	1.50	2.00
No. 111	1.50	2.00
No. 112	1.50	2.00
No. 113	1.50	2.00
No. 114	1.50	2.00
No. 115	1.50	2.00
No. 116	1.50	2.00
No. 117	1.50	2.00
No. 118	1.50	2.00
No. 119	1.50	2.00
No. 120	1.50	2.00
No. 121	1.50	2.00
No. 122	1.50	2.00
No. 123	1.50	2.00
No. 124	1.50	2.00
No. 125	1.50	2.00
No. 126	1.50	2.00
No. 127	1.50	2.00
No. 128	1.50	2.00
No. 129	1.50	2.00
No. 130	1.50	2.00
No. 131	1.50	2.00
No. 132	1.50	2.00
No. 133	1.50	2.00
No. 134	1.50	2.00
No. 135	1.50	2.00
No. 136	1.50	2.00
No. 137	1.50	2.00
No. 138	1.50	2.00
No. 139	1.50	2.00
No. 140	1.50	2.00
No. 141	1.50	2.00
No. 142	1.50	2.00
No. 143	1.50	2.00
No. 144	1.50	2.00
No. 145	1.50	2.00
No. 146	1.50	2.00
No. 147	1.50	2.00
No. 148	1.50	2.00
No. 149	1.50	2.00
No. 150	1.50	2.00
No. 151	1.50	2.00
No. 152	1.50	2.00
No. 153	1.50	2.00
No. 154	1.50	2.00
No. 155	1.50	2.00
No. 156	1.50	2.

The Ripley Hinge Works, Ripley, Ohio, are in operation, producing Strap Hinges which are claimed to be of excellent quality. The company announce that the machinery, tools and appliances are practically those used for similar work elsewhere, differing only in an attempt at construction upon the most economical plan. They add that it would have been easier to construct if they had cared little for cost and less for income. The trade will await with interest further announcements concerning the line of goods manufactured and the prices.

We learn that in the suit brought by the Globe Nail Company against the Essex Horse Nail Company, an injunction was recently granted restraining the defendants from pointing Horse Nails by the use of the Chase Reissue Patent No. 5207. This injunction is, we are informed, being strictly observed, but the company call attention to the fact that it does not prevent them from pointing their Nails by other methods, nor restrain them nor any of their customers or agents from selling their product, a large stock of which they had on hand at the time the injunction was granted, and which, with what they will be able to manufacture by other methods not covered by the patent in question, will enable them to fill all demands until the expiration of the patent on the 6th of June next. The company thus make the point that, so far as the trade or their customers are concerned, the injunction can have no injurious bearing.

Slye & Beery, Upper Sandusky, Ohio, in their advertisement on page 37, illustrate and offer to the trade their new Eureka Hog Ring. In the circular referring to this article they call attention to the special points of advantage which are claimed for it, among which are these: That never more than one Ring is required; that it will positively prevent rooting; that when adjusted it will not turn up, down or sideways; that it in no way interferes with the hog's feeding; but for further information we must refer our readers to the advertisement and circulars of the manufacturers.

The assurance of a large ice crop through all sections of the country where natural ice is harvested is referred to as giving a prospect of a large trade in Refrigerators for the coming season, and with an early spring trade the expectation is expressed that the volume of trade in this line will be larger than it was last year.

Wm. H. H. Rogers, manufacturer of Folding Paper Boxes, 51 and 53 Leonard street, New York, introduces to the trade a novelty in the way of a Folding Nail Box. He describes it as quickly adjusted, having but two fasteners, making a neat package and saving twine and time. They are made for 3, 5 and 10 pounds of Nails, and are sold at 4¢ cents per pound. If desired, the dealers' card is printed on two sides of the box without additional charge.

CATALOGUES AND LISTS.

The American Saw Company, Trenton, N. J., have issued their catalogue for 1885, showing the variety of Circular, Mill, Mulay, Gang and Crosscut Saws which they manufacture. The list also covers Circular Saw Mandrels, Swages, Hand Screw Press, Wrenches and other tools connected with this line. Their patent Inserted Tooth Circulars, which are the specialty of the company, are fully illustrated and described, cuts being given of the different forms of Tooth which are thus used. This catalogue will be of special interest to the trade because of its complete exhibit of these Inserted Tooth Saws.

Andrew Tredway & Sons, Dubuque, Iowa, issue a price list of such seasonable goods as Batcheller's Forks and Auburn Manufacturing Company's Forks, Hoes, Rakes, &c., David Wadsworth & Sons' Scythes and Handles, Snaths, Wheelbarrows, Shovels, &c. They mention that they carry in stock a full line of Heavy and Shelf Hardware, Iron Wagon Stock, Tinner's Stock, Tin-ware, &c.

The Grand Rapids Refrigerator Company, Grand Rapids, Mich., have issued their catalogue for the present season. They announce that they have removed to their new factory, which they refer to as thoroughly equipped. The list describes their well-known Leonard Refrigerators, and illustrates the Leonard Refrigerator Lock, to which they call special attention.

The Lockwood Mfg. Co., South Norwalk, Conn., issue their illustrated and descriptive catalogue of Door Locks, Knobs and Builders' Hardware for the present year. It exhibits, with cuts and descriptions, but without list prices, a line of Latches, Mortise Locks, Night Latches, Dead Locks, Rim Locks, Keys, Jet Door Knobs and Sash Fasteners.

The United Brass Company, 79 Fulton street and 54 Gold street, New York, have just issued their Hardware catalogue, which will be regarded by the trade with much interest. It will be seen that this company have works at Lorain, Ohio, and Haydenville, Mass., to illustrations of which two pages are devoted. The list exhibits a large line of Cocks, Bibbs and Rough Stops, as well as Air Pumps, Hose Pipes, Nozzles, Tips, Couplings, Sprinkler Supplies, &c., and a variety of miscellaneous articles connected with the same line. The book is an attractive volume, and well arranged, a feature deserving special mention being the very convenient method they have adopted of arranging their telegraphic code. Instead of presenting it as a table, they have printed each code word, in red ink, under the price of the article it refers to. By this plan the trouble of looking up the designating word

is entirely obviated, thus saving both time and labor to the purchaser. The book is very fully illustrated, and the cuts are excellent.

R. Armiger & Son, No. 10 South Charles street, Baltimore, Md., have issued a catalogue of their Refrigerators and House-Furnishing Specialties. They call particular attention to their "Alpine" Refrigerators, which they now furnish with porcelain-lined water tanks, and also their Walnut Buffet and Sideboard Refrigerators. Their "Climax" Refrigerators, of which they make seven different styles of various sizes, are furnished with sideboard backs when desired, making an attractive piece of furniture. The special merit claimed for these Refrigerators is that they are self-purifying, and are so arranged that no drip-pan is required, all the water being collected and utilized in the water cooler. A new Refrigerator, the "Climax," is represented in their list, an article which is made of poplar and finished in either oak or walnut color. It has porcelain-lined tanks and an extra provision chamber alongside the tank, with an opening on top. They are described as well made and finished, having good locks and knobs and furnished with white porcelain casters.

The catalogue and price list of the S. Obermayer Foundry Supply Mfg. Co., Cincinnati, Ohio, has been issued for the present year. From this it appears that S. Obermayer & Co. have disposed of their business to the above company, retiring, however, only in name, the announcement being made that they have associated with themselves gentlemen who are widely known in the foundries of the United States and Canada. They call the attention of the trade to certain trade-marks which belong to them, and to which they claim the exclusive right, warning manufacturers and the trade against infringements. They announce that, in the present catalogue they present five new Facings for dusting and blacking, invented since the issue of their last list, for the quality of which they make special claims. The catalogue contains matters of interest with reference to their Foundry Facings and Blackings, and exhibits a line of Cast Steel Brushes, Foundry and Machine Shop Brushes, Molders' Tools and Implements, for more definite information concerning which we refer our readers to the catalogue.

The E. C. Meacham Arms Company, St. Louis, issue a price list, February 12, 1885, which is to supersede all their previous lists. This pamphlet covers a large and varied line of Guns, Rifles, Pistols, Cartridges, Gun Fixtures and Sporting Goods, and is an evidence of the enterprise and extensive business of the house that issues it. They also advise us that they have in stock several thousand Springfield Military Rifles, 50-70, which they speak of as adapted to military companies not having a large amount of money to put into arms, as they are sold at about \$6 each.

Metal Market.

Copper.—During the week under review the market has been featureless and quiet, sales being of a retail character merely, but prices remaining firm. We quote at the close, Lake Superior 11½¢ @ 11½¢, and other brands 10½¢ @ 11¢. The Chili Bar market has lacked strength and steadiness, and for a couple of days went off to a figure lower than hitherto seen. The quotations were as follows: February 19, £47. 5/; February 20, £47. 2/6; February 21, £47. 2/6; February 22, £47. 5/; February 24, £47. 5/, and this morning the same figure. Best Selected has been steady, £52. Spanish export of Pyrites the first 11 months of 1884, 558,146 tons, against last year 521,060, and 533,995 in 1882; of Ingots Copper only 16,672 tons, against 21,192 in 1883, and 19,829 in 1882. Manufactures may be nominally quoted: Bottoms, 18¢; Braziers, 17½¢; Sheathing, 16¢, and Bolt Copper, 15¢. We are cabled from London that the market is a little steadier. Best Selected, £52 @ £53, and Chili Bars, £47 @ £47. 10/.

Tin.—London one moment last week advanced with Straits Tin to £79, cash, and £79 15/ futures, but has not been quite sustained, coming £78. 15/ cash, this morning, and £79. 10/ three months. Our own market has shown little alacrity in conforming itself to this fresh advance, and has remained sulken and expectant at \$17.60, cash, and \$17.70, 30 days. The following cablegram reaches us from London: "Market a little firmer. Straits Ingots, spot, £79 @ £79. 10/; and futures, £79. 10/ @ £80. 5/." **Tin Plates.**—The market has been easier, the bad weather out West checking the demand. We quote at the close, large lines, ordinary brands, £1 box: Charcoal Bright, 84 90 @ 85 50; do. Terne, 84.37½ @ 84.55; Coke Tin, 84.40 @ 84.50; and do. Terne, 84.35. Liverpool is quite firm at 13/9 @ 14/4, Coke, and 15/9 @ 17/6, Charcoal. From London we are told that Tin Plates are firmer, without quotable change in price.

Lead.—There sold 300 tons St. Joseph's at \$3.62½ @ \$3.65, and 200 tons Corroding at \$3.65. Although some ask \$3.70, the market cannot at the close be called any better than \$3.65 for both. At St. Louis, Corroding sold at a price equal to \$3.70 laid down here. Spanish Pig Lead exportation during the first 11 months of 1884, 108,227 tons, against 116,049 in 1883, and 106,783 in 1882. Soft Spanish is unaltered in the London market, at £10. 10/.

Manufactures are quoted as follows: Lead Pipe, 5¾¢ lb;

Sheet Lead, 6¾¢; Tin-Lined Lead Pipe, 15¢, and Block-Tin Pipe, 40¢, allowing in trade for Old Lead delivered in New York 3¢ lb. Shot: Drop, 6¢; Buck, 7¢; Chilled, 7¢. Shot in 5-lb bags, 1¢ lb extra. From London we learn this afternoon that the market is unchanged.

Spelter and Zinc.—A dragging state of affairs has been noticeable in the market for Common Domestic Spelter, at \$4.30 for ordinary lots, up to \$4.50 for choice brands, and at these figures the market closes dull. Silesian we quote at \$4.80, nominally. Reports from Breslau state that there is a good demand there. Spanish Calamine export, first 11 months of 1884, 27,277 tons, against 28,439 in 1883 and 24,597 in 1882. We quote Berthia Refined 8¢. Silesian has remained steady in the London market at £1.4. Sheet Zinc is moderately active at \$5.15 @ \$5.25 for Domestic. We are cabled from London that there is no change in the market.

Antimony.—Has been dull at 9½¢ for Hallett, and 10½¢ for Cookson. The former remains unaltered at £39 in London.

Metal Exchange.

The following transactions have been reported as having occurred on the floor of the New York Metal Exchange since our last:

WEDNESDAY, February 18.	
30 tons Tin, April.....	\$0.173
15 tons Tin, March.....	.179
TUESDAY, February 19.	
10 tons Tin, April.....	.178

INDUSTRIAL ITEMS.

NEW JERSEY.

The blast furnace at Secaucus was blown in recently.

PENNSYLVANIA.

The Main Belting Company, of Philadelphia, manufacturers of "Leviathan" cotton belting, have at the New Orleans Exposition a mammoth belt, 7½ feet wide, 8 ply thick, which is said to be the largest belt ever exhibited. These goods are working their way into general use, for the reason that they can be made any width, length or thickness, without lap or joint to be affected by dampness, therefore can be used in all kinds of places where belting is needed. Many of these belts can be seen in use throughout the exposition, where they are doing good service. Their exhibit is in charge of Mr. M. Campbell.

The puddling department of the Stony Creek Rolling Mill, at Norristown, owned by J. H. Boone, of Reading, started up on February 17.

The Laurel Iron Works, of Carmichael & Emmons, at Coatesville, are receiving new machinery, intended for turning out heavy plates.

The Manhattan Hardware Works, Reading, are crowded with orders, and the wages of the 16 molders will be increased 5 per cent. on March 1, and a further advance of 5 per cent. on May 1.

The mills of the Phoenix Iron Company, at Phoenixville, will go into operation this week, single turn.

The Hope Mill of the Pottstown Iron Company is now being put in order with the intention of starting it again. It has been idle for a year.

About 50 molders employed by the Scranton Stove Company quit work on February 18. A few days ago about 15 men were suspended, and the manager employed an apprentice. The men remonstrated and insisted that if an additional man was employed it should be one of those suspended. The manager did not yield, and they left the works.

Nathaniel Ferguson, senior member of the firm of Ferguson, White & Co., of Robesonia Furnace, one of the oldest iron-producing establishments in Pennsylvania, has sold out his interest to Wm. R. White, of Philadelphia. Mr. Ferguson has been connected with Robesonia Furnaces for the past 28 years, and is well-known among iron men all over the State.

John A. Wood & Son, of Pittsburgh, have leased the Connell coke plant on the Monongahela River, opposite Elizabeth, and will operate it.

The Charlotte Furnace Company will blow out their furnace at Scottsdale this week, to make necessary repairs to lining and hot blast.

A small cupola furnace at Harrisburg, owned by Buchanan, Fisher & Co., was destroyed by fire on February 11. The furnace was used to melt buckshot, which was run into pigs or rough castings, such as ash weights, &c. A similar furnace is being erected by the same firm at Lebanon.

No. 2 blast furnace of the E. & G. Brooke Iron Company made an output last week of 450 tons of pig iron.

PITTSBURGH AND VICINITY.

B. F. Rafferty & Co. have effected a compromise with their creditors by agreeing to pay one-third of their indebtedness this month, one-third next month and the balance in six months.

The Linden Steel Company, Limited, are now preparing the foundations for a new 100-ton train of rolls, to be used for general work.

Moorhead & Co. will resume operations at their Soho Mill this week, the striking employees agreeing to go back at the reduction in wages announced by the firm, which was the cause of the strike.

A meeting of the coke syndicate was held in this city on February 18. The reports from the different firms in the combination show that the demand for coke during the past few days exceeded the production, it was unanimously decided to order the firing up of 10 per cent. more ovens at once, and that the ovens run six days a week. This will increase the production to 60 per

cent of the capacity of the works controlled by the syndicate. There was no talk of an advance in prices, but it is possible that the rates will be increased to \$1.25 about April 1.

The firm of Thompson, Epping & Carpenter, manufacturers of pumps, &c., has been dissolved by the retirement of Mr. J. D. Thompson. The business will be carried on by the remaining partners.

Furnaces A, C, D and E, of the Edgar Thomson Steel Works, at Braddock, are now in blast. Furnace B is being repaired.

The Westinghouse Machine Company, report trade as opening remarkably active in 1885. Their sales for the month of January were 67 engines, aggregating 1752 horse-power, which is certainly good for hard times. The electric-light industry still continues to furnish plenty of business. Besides a large number of engines for lighting private establishments they have contracted for one or more engines for the following public light companies: The Newton Electric Light Company, of Newton, Iowa; the Champion Electric Light Company, of Springfield, Ohio; the Excelsior Electric Light Company, Port Huron, Mich.; the Northwestern Electric Light and Power Company, Omaha, Neb.; the Weston Electric Light Company, Lexington, Ky., and the Brush Electric Light Company, Buffalo, N. Y., who order two more engines of 65 horse-power each, making 12 Westinghouse engines in all which are running in their principal stations.

McCullly & Co. will start up a new furnace at their bottle factory, on Twenty-sixth street, the latter part of this month. The addition will employ about 16 blowers and 70 boys. The brightening up of the bottle business necessitated a larger plant.

Robinson, Rea & Co., whose foundry and machine shops were destroyed by fire some time ago, expect to commence as soon as the weather will permit the erection of new shops with all modern improvements. They have occupied temporary quarters since the fire, but have not been inconvenienced to any extent in their work from this cause.

An explosion took place at the Apollo Mill of the Volta Iron Company, Limited, last week, by which the end of the engine house was blown out and the engineer severely scalded.

The stove molders of Pittsburgh are discussing the advisability of making some move to have the rates of wages in force before the last strike restored. A committee will be appointed to confer with the manufacturers. It was reported last week that the latter had also held a meeting and decided to grant no reduction, but this is denied by the manufacturers.

OHIO.

It has been telegraphed throughout the country that a disagreement between the Junction Iron Company, of Mingo Junction, and their employees has led to the discharge of their puddlers and the commencement of the manufacture of steel nails. President Laughlin, after denying the statement, says: "We expect to pay the puddlers what we have agreed to, or stop only when we cannot do it, but we have often said we thought the true interests of the boilers would be advanced by a voluntary reduction on their part for puddling, thus enabling us to continue making iron nails, which we are now doing, some 1300 kegs daily, of superior quality, and selling the same without having a guarantee required that the heads won't fly off. And there are many of our customers who will only have iron, which we will continue making if we have proper reductions in our labor departments, placing us on an equality with labor in the East and with those manufacturers in this locality who have substituted machinery in the place of manual labor. I ask the correction of the statement made regarding ourselves and employees, which is utterly without foundation, and has given rise to considerable complaint in our community and mills."

Negotiations are going forward in Springfield looking to the establishment there of extensive machine works formerly at Fulton, N. Y. A five-story brick building will be leased, and the concern will probably be ready to start in May next with a force of 50 and 100 operatives.

The boilers at Wheeling which have recently lost their situations through the substitution of steel for iron by certain of the nail mills there are endeavoring to compel the nailers to demand 20 per cent. more wages for cutting steel nails, by way of retaliation, but without success so far.

ALABAMA.

It is reported that the Birmingham Rolling Mill Company, of Birmingham, contemplate refitting their mills with a view to making steel instead of iron.

Sloss Furnaces are both running successfully, making 160 tons of foundry and forge iron a day. The company are shipping largely to Eastern points.

Messrs. Aiken & Lighton, manufacturers of foundry molding machinery, Birmingham, have occupied their new works. The foundry is 50 x 85 feet, with truss roof, and is completely filled with foundry molding machines. The finishing shop is 30 x 50 feet, with two-story front, the upper story being used as the pattern shop.

TENNESSEE.

Warren Charcoal Furnace is soon to blow out for repairs. Her product for some time has run from 40 to 50 tons a day.

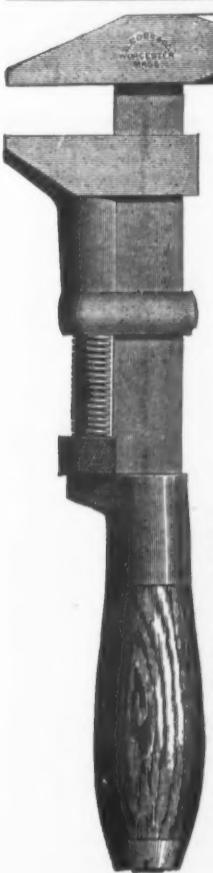
South Pittsburgh and Sewannee furnaces have for a month averaged more than two-thirds of their output, foundry grades.

KENTUCKY.

Messrs. B. F. Avery & Sons, manufacturers of plows, &c., are running to their full capacity, which is 2000 plows per day, and say they are behind their orders. The season began late, but they are making up for lost time.

The Louisville Agricultural Works are running full, and claim to have a good supply of orders.

and are about ready to place an order for a quantity of steel. Machinery for these works are being rapidly put in place and additional purchases are being made. Some \$20,000 to \$30,000 worth of machinery will be put in to start with. A specialty will be made of safe-deposit vault work, in which it is proposed to



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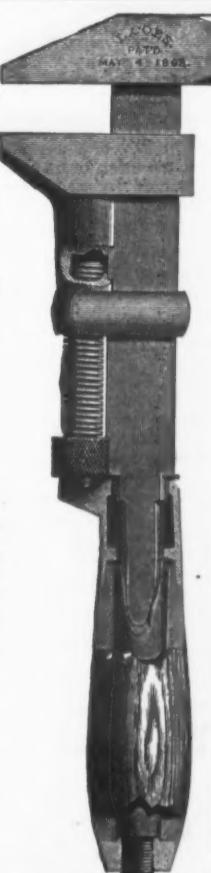
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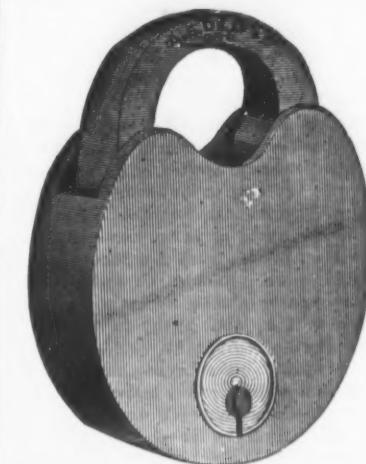
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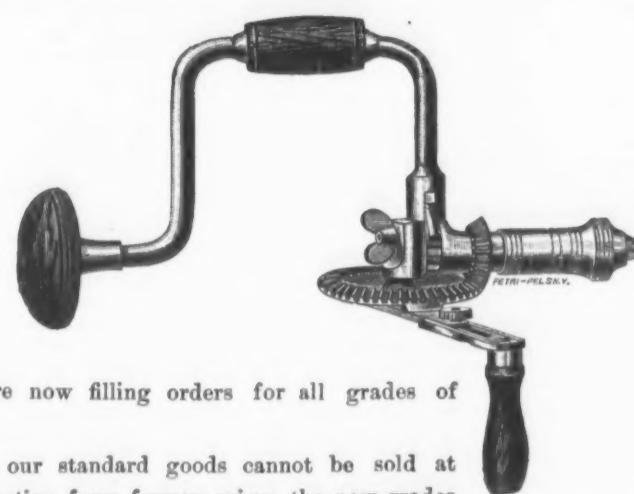
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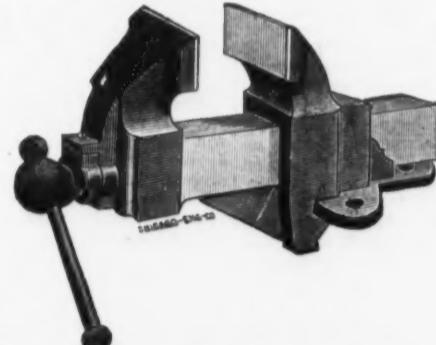
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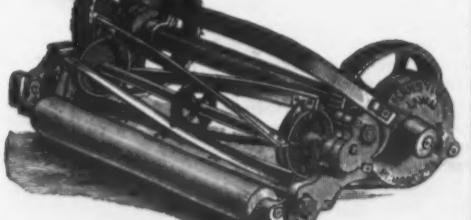
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THE TODD-DONIGAN IRON CO., Louisville, Ky.
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(Continued from page 18.)

tons of ingots being made from pig carrying from .09 to .14 of phosphorus. The metal possessed an ever-constant welding property, with great toughness. My attention having been called to the process by Mr. James P. Withrow, who had witnessed its working in England, and had, with Mr. Henry W. Oliver, Jr., secured the control of the patents in this country, Mr. Oliver kindly gave me every facility to investigate what they were doing, as well as putting the works at my disposal to try any experiments I might desire. Being anxious to determine to what extent the use of high-phosphorus iron was possible, I first had a mixture tried which gave a metal with about 34 per cent. of that element. To my surprise this worked so well that I ventured further and doubled my proportion of high-phosphorus pig, obtaining a steel with .54 per cent. of phosphorus, and my surprise certainly did not decrease when I saw the test piece bend double cold and the metal work beautifully when hot. Thinking these results might be instances of those accidents which sometimes defy explanation, I had the experiments repeated, with like results, and since then many tons of this high-phosphorus metal have been made and used for various purposes. Some of the ingots were rolled into slabs and sent to the works of the Albany and Rensselaer Iron and Steel Company, at Troy, where they were rolled into nail plate and cut into nails at the factory of that company. These samples which I have before me are some of them, and I think no one can question their quality being all that could be desired. In fact, they possess a stiffness which is valuable, while their ability to stand torture speaks for itself.

This partially-finished shovel was also made from Clapp-Griffiths metal. As you see, the strap has been jumped on and a perfect weld made. The lower end was quenched in water and turned over cold without producing more of a flaw than you see. Mr. J. M. Sherred, chemist of the Albany and Rensselaer Iron and Steel Company finds it contains:

Carbon	.11
Silicon	.014
Sulphur	.126
Phosphorus	.546
Manganese	.58

This shovel is not an isolated case, but hundreds of them have been made from the same grade of metal. These other samples are also from the phosphorus metal, while these button-head bolts, bent double in the thread, are from metal made from ordinary Bessemer pig. Several physical tests have been made from these phosphorus steels, some from pieces rolled from the sprues or gates made in bottom casting, and others from specimens rolled from perfect ingots. From the latter, which are the only fair tests, the results have been:

	Tensile Strength, Pounds.	Elastic Limit, Pounds.	Elongation, Per cent.	Reduction of area, Per cent.
Oct. 27, '84.	74,790	55,070	25.25	48.8
Nov. 11, '84.	80,020	55,060	23.0	36.9
Nov. 11, '84.	80,270	56,290	22.75	30.6
Nov. 11, '84.	80,420	56,290	17.5	14.3
Nov. 11, '84.	78,730	56,410	14.25	15.3
Feb. 4, '85.	80,940	58,570	24.00	39.4
	79,870	68,570	23.25	36.4
	80,670	60,240	23.00	32.5
	79,700	59,550	23.25	37.6

In all cases $\frac{1}{2}$ -inch round test pieces were used, 8 inches long.

The steel tested on February 4 had the following composition:

Carbon	.06
Silicon	.50
Phosphorus	.48
Manganese	.48
Sulphur	.09

How far and with what certainty the use of high-phosphorus irons can be carried remains to be determined. The works of Messrs. Oliver Bros. & Phillips have been so pressed with orders that I did not feel at liberty to further interfere with their running. The demand for Clapp-Griffiths metal increased to such an extent that it became evident they must be altered to permit of a greater output. This is about completed, and when they resume I have no doubt the experiments will be continued. While at this time not entering into the discussion of the effect of silicon in metals, one very striking peculiarity of the steel made in the Clapp-Griffiths converter claims our attention. In all the determinations of silicon in this metal which I have seen, and they have been many, there have been but four showing over .02 per cent. of that element, and they were from spout heats, while 50 per cent. of the analyses have given but .01, and in 12 per cent. of them the silicon has been too low for estimation.

The nails shown had but .009 silicon, and the shovel but .014 per cent. Does not this low silicon permit of the high phosphorus? The loss in the process is much higher than in the ordinary Bessemer converter. No doubt this comes from the column of iron being so shallow over the tuyeres. It is a marked peculiarity of the blows that red smoke from burning iron appears at the very commencement, but clears away toward the middle of the heat. The cinder soon rises and runs off at the tap-hole. Presently this flow of cinder entirely ceases. Now, is it not plausible that the early oxidation of iron furnishes a base which carries off the silicon of the bath? And does not this, with the low blast pressure, account for the constant small percentages of silicon in the metal? There must be a reason for it. The percentages of silicon in the pig used vary largely; but something constantly eliminates it. Low silicon steel is and can be made in the ordinary Bessemer converter, but I have never made steel having silicon so low as .01 per cent., and we well know that it is not a constant characteristic. I do not speak of the higher carbon steels, for in their manufacture considerable silicon is introduced with the recarbonizer. I am fully convinced that the Clapp-Griffiths converter possesses great value for this country. While believing that it cannot make rails or ship plates in competition with the regular Bessemer plants, it can compete with them in small products, even if it does not make an article which they cannot produce. And most certainly the open-hearth is out of the race, so far as cost of product is concerned.

Professor Tunner has lately taken position against both the Avesta and Clapp-Griffiths

or any other small converter, so far as their value relates to making low-carbon steels. He admits that they may be of use to certain Alpine districts of Austria, but for producing soft metals he favors either the basic or Siemens-Martin processes. It is with great hesitation that I venture to differ from so eminent an authority. My excuse must be that I speak for America, he for Continental Europe.

To place a basic plant on an equality with an acid one, in the matter of costs, it seems to be well established that the basic iron must be quite \$3 per ton cheaper than the pig for the acid process. Then the plant is very expensive one—much more so than the regular Bessemer. You must build both a steel works and a brickyard. In Continental Europe, where labor is so ill paid and the phosphorus ores so much cheaper than the purer ones, the status is no doubt quite different. This is leaving out of consideration any use of high-phosphorus irons in the Clapp-Griffiths. But if further experience proves that, for many purposes we can take either a mixture of 50 per cent. Bessemer at \$17, and 50 per cent. mill iron with 1 per cent. of phosphorus at \$15, making pig cost \$16, or take cheap irons, which can be made in so many sections with from .30 per cent. to .50 per cent. phosphorus, we ought to produce, as previously shown, a metal for \$21.95 per ton of ingots, and these ingots of a size and shape to be rolled into many finished products. As intimated before, the demand for low steels is constantly increasing. Take steel nails for instance. If they have not already replaced iron ones in the market, they are rapidly doing so, and all the resolutions of lodges of the Amalgamated Association will not stop the irresistible march of events. To supply this demand, in my judgment, the modest Clapp-Griffiths converter offers peculiar advantages.

A most interesting discussion followed the reading of these papers, particular stress being laid upon the results obtained with high-phosphorus pig iron, and the opportunity afforded by the success of this process to rolling mills and blast furnaces to enter into the manufacture of steel at a minimum of expenditure and abandonment or destruction of but little existing plant. The discussion was participated in by Messrs. Kent, Maynard, Ward and Firmstone. Following these papers was an equally interesting one by William P. Blake, New Haven, Conn., on

THE TIN-ORE VEINS IN THE BLACK HILLS OF DAKOTA.

The discovery of tin ore in the Black Hills of Dakota dates from June, 1883, and short preliminary notices were published in September of that year. The discovery point is known as the Etta Mine, in the central portion of the Hills, about 6 miles east of Harney Peak, and 20 from Rapid City. The Etta was located for mica. It is a granitic mass, rising in the midst of fine-grained mica-schist and arenaceous slates, which resemble the Coos group of the White Mountain formations of New Hampshire. Some portions of these slates are highly garnetiferous, other portions contain staurolite, and in some places there is a large development of sandstones of regular stratification, in thick beds, which form prominent ridges. These sandstones are compact and solid, and possess a bluish-gray color, due to protoxide of iron. They are in the condition of quartzites, and they indicate shallow seas on the borders of some continental or extensive shores in that remote period of the world's history.

There is a singular absence of limestone strata and of magnesian rocks in these old formations. Hornblendic slates and syenitic rocks are also rare. Granite in the form of bosses and (nearer to the Harney Peak range) in long dikes is common. But at the Etta and in its vicinity the granitic masses are columnar, rather than tabular, in form.

The Etta outcrop is nearly circular, in horizontal section, measuring about 200 feet in its longest diameter, and 100 to 150 feet in its transverse diameter across the outcrop.

The line of demarcation between this granite mass and the slates is sharp and distinct; and where the contact is opened to view by the lower tunnel, there is a clay selvage making a distinct wall, as in regular veins. This mass, like most of the similarly-formed granitic masses of the region, is characterized by extremely coarse, massive crystallization of the constituent minerals. Slabs of pure feldspar from 12 to 20 inches in length may be frequently seen, and masses of white quartz several feet thick and nearly pure are abundant.

The outcrop and the whole columnar mass have a rudely concentric structure, the outer portions, next to the country rock, being characterized by a band or belt of dark-colored mica, alternating in places with muscovite in large plates. This is succeeded by massive quartz, with irregular bunches of massive albite and of orthoclase feldspar, together with enormous crystals of spodumene and irregular bunches of a dense aggregation of small crystals of mica and albite, forming a kind of greisen-rock, an albite greisen, in which cassiterite is abundantly disseminated in small grains and partly-formed crystals.

The mineralization is remarkably even. The masses of greisen are rarely without the black grains of cassiterite sprinkled through the mass. The percentage of black tin is not yet ascertained by working in mill in the large way, but average samples show that it is about $2\frac{1}{2}$ per cent. Hand samples of selected rock will yield as high as 6 per cent. The result originally obtained by sampling the outcrop was 3 per cent. A sample lot of 2 tons of greisen-rock ore sent to New York, and there worked, yielded between 3 and 4 per cent. of concentrate—black tin of high grade—some of which, smelted by Mr. Riotti, at the New York Metallurgical Works, gave a number of 25-pound bars of excellent tin. These percentages are, of course, independent of the massive cassiterite, of which some hundredths have been found outside the greisen-rock. This occurrence is exceptional, but more may at any time be brought to light by the excavations. The percentage of black tin in the ore compares favorably with that found in the ore of other tin regions. The general average percentage of black tin of six large mines upon the great flat lode of Redruth, Cornwall, in 1876, was 2.75, and less than this has been worked with profit in some places.

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Current Hardware Prices, February 25, 1885.

HARDWARE.

Avuls.

A Eagle Anvils American. $\frac{1}{2}$ lb 10¢-dis 20¢
Wright's. $\frac{1}{2}$ lb 10¢-dis 10¢
Armstrong Mouse Hole. $\frac{1}{2}$ lb 10¢
Armitage Mouse Hole, Extra. $\frac{1}{2}$ lb 11¢
Prenton. $\frac{1}{2}$ lb 11¢
Wilkinson's. $\frac{1}{2}$ lb 11¢
J. & Riley Carr, Patent Solid. $\frac{1}{2}$ lb 11¢
Anvil Vise and Drill. $\frac{1}{2}$ lb 10¢
Millers Falls Co., \$18.00.
Cherry Anvils and Vise. $\frac{1}{2}$ lb 10¢

Apple Pavers.

Advanced. $\frac{1}{2}$ lb 57¢
Champion. $\frac{1}{2}$ lb 55¢
Family Bay State. $\frac{1}{2}$ lb 12¢
Gem. $\frac{1}{2}$ lb 35¢
Gold Medal. $\frac{1}{2}$ lb 50¢-dis 10¢
Improved. $\frac{1}{2}$ lb 50¢
Improved Bay State, with push off. $\frac{1}{2}$ lb 33¢
Jersey. $\frac{1}{2}$ lb 75¢-dis 10¢
Little Star. $\frac{1}{2}$ lb 55¢
New Lightning. $\frac{1}{2}$ lb 70¢
Orifice. $\frac{1}{2}$ lb 55¢
Penn. $\frac{1}{2}$ lb 55¢
Rocking Table. $\frac{1}{2}$ lb 75¢
Triumph. $\frac{1}{2}$ lb 55¢
Turntable, Original. $\frac{1}{2}$ lb 50¢
Turntable, Improved. $\frac{1}{2}$ lb 50¢
Waverly. $\frac{1}{2}$ lb 55¢
White Mountain. $\frac{1}{2}$ lb 55¢
"1776". $\frac{1}{2}$ lb 55¢
"1778". $\frac{1}{2}$ lb 55¢

Augers and Bits.

First Quality. $\frac{1}{2}$ lb 90¢-dis 10¢-dis 20¢
Stern's "Bates". $\frac{1}{2}$ lb 70¢-dis 10¢

Cook's, Douglass Mfg. Co. $\frac{1}{2}$ lb 55¢
Cook's, New Haven Copper Co. $\frac{1}{2}$ lb 50¢

Bazett's, New Haven Copper Co. $\frac{1}{2}$ lb 50¢

Expansive Bits, Ives' No. 4, per dozen. $\frac{1}{2}$ lb 60¢-dis 20¢-dis 20¢

Expansive Bits, Blakes'. $\frac{1}{2}$ lb 60¢-dis 20¢

Expansive Bits, Asonia. $\frac{1}{2}$ lb 25¢

Hollow Augers, Evans. $\frac{1}{2}$ lb 25¢

Hollow Augers, French. $\frac{1}{2}$ lb 25¢

Hollow Augers, Douglass. $\frac{1}{2}$ lb 25¢

Hollow Augers, Bonney's Adjust. $\frac{1}{2}$ lb 28¢-dis 40¢-dis 10¢

Hollow Augers, Stearns' Adjust. $\frac{1}{2}$ lb 28¢-dis 40¢-dis 10¢

Hollow Augers, French. $\frac{1}{2}$ lb 25¢-dis 10¢

Hollow Augers, Universal Expan. each. $\frac{1}{2}$ lb 50¢

Wood's. $\frac{1}{2}$ lb 25¢

Gimble Bits. $\frac{1}{2}$ lb 50¢ gross, dis 50¢

Gimble Bit, Standard. $\frac{1}{2}$ lb 25¢

Double Cut Gimble Bit, Shepardon's. $\frac{1}{2}$ lb 45¢

Double Cut Gimble Bit, Valley Mfg. Co. $\frac{1}{2}$ lb 30¢-dis 10¢

Double Cut Gimble Bit, Hartwell's. $\frac{1}{2}$ lb 40¢

Double Cut Gimble Bit, Hartwell's. $\frac{1}{2}$ lb 40¢

Double Cut Gimble Bit, Ives'. $\frac{1}{2}$ lb 50¢

Holtz Bit Stock Drills. $\frac{1}{2}$ lb 25¢-dis 10¢

Syracuse Twist Drill Co. Wood Drills. $\frac{1}{2}$ lb 25¢

L'Hommedieu's Ship Augers. $\frac{1}{2}$ lb 25¢

Water Augers, French. $\frac{1}{2}$ lb 25¢

WHOLESALE METAL PRICES, February 25, 1885.

METALS.

IRON.—DUTY: Bars, 8-10¢ to 11-10¢ $\frac{1}{2}$ lb.; provided that no Bar Iron shall pay a less rate of duty than 35¢. Sheet, 11-16¢ to 15-16¢ $\frac{1}{2}$ lb. Band, Hoop and Scroll, 16¢ to 14-10¢ $\frac{1}{2}$ lb. Rail Bar weighing more than 25 lb. $\frac{1}{2}$ lb. yard, 7-10¢ of 1¢ $\frac{1}{2}$ lb.

Standard American Pig Iron.

Foundry No. 1 X. $\frac{1}{2}$ ton \$18.00 @ 19.00
Foundry No. 2 X. $\frac{1}{2}$ ton 17.00 @ 17.00
Gray Forge. $\frac{1}{2}$ ton 16.00 @ 17.00

No. 1 Scotch Pig Iron.

Carnbroe. $\frac{1}{2}$ ton 19.50 @ 20.50
Coltness. $\frac{1}{2}$ ton 21.50
Shotts. $\frac{1}{2}$ ton 21.50 @ 22.00
Glenarock. $\frac{1}{2}$ ton 19.50 @ 20.00
Gartshie. $\frac{1}{2}$ ton 21.00 @ 21.50
Langloan. $\frac{1}{2}$ ton 21.50 @ 22.00
Summerlee. $\frac{1}{2}$ ton 20.50 @ 21.00
Dalmellington. $\frac{1}{2}$ ton 19.50 @ 20.00
Eglinton. $\frac{1}{2}$ ton 18.50 @ 19.00
Clyde. $\frac{1}{2}$ ton 19.00 @ 19.25

Rails.

Steel, at Eastern mills. $\frac{1}{2}$ ton @ 27.00
Old Raila, T. $\frac{1}{2}$ ton 16.50 @ 17.00

Scrap.

Wrought, $\frac{1}{2}$ ton, from yard. 17.50 @ 18.00

Bar Iron from Store.

Common Iron. $\frac{1}{2}$ in. round and square. $\frac{1}{2}$ lb. 1.6 @ 1.9¢
1 in. 6 in. $\frac{1}{2}$ in. to 1 in. $\frac{1}{2}$ lb. 1.6 @ 1.9¢

Refined Iron. $\frac{1}{2}$ to 2 in. round and square. $\frac{1}{2}$ lb. 1.9 @ 2.2¢
1 to 6 in. $\frac{1}{2}$ in. to 1 in. $\frac{1}{2}$ lb. 2.1 @ 2.4¢
1 to 6 in. $\frac{1}{2}$ in. and 16. $\frac{1}{2}$ lb. 2.1 @ 2.4¢
Rods—6 and 11-15 round and sq. $\frac{1}{2}$ lb. 2.2 @ 2.8¢
Bands—1 to 6x3-16 to No. 12. $\frac{1}{2}$ lb. 2.3 @ 2.8¢
" Burden's Best" Iron, base price. $\frac{1}{2}$ lb. 2.8¢
Burden's H. B. & S. Iron, base price. $\frac{1}{2}$ lb. 2.8¢
Norway Nail Rods. $\frac{1}{2}$ lb. 2.8¢

Sheet Iron from Store.

Common. R. G. American. Cleaned.
Nos. 10 to 16. $\frac{1}{2}$ lb. 2.70 @ 3.0¢
17 to 20. $\frac{1}{2}$ lb. 3.0¢
21 to 24. $\frac{1}{2}$ lb. 3.25¢
25 and 26. $\frac{1}{2}$ lb. 3.50¢
27. $\frac{1}{2}$ lb. 3.75¢
28. $\frac{1}{2}$ lb. 4.0¢
Galvanized. 10 to 20. $\frac{1}{2}$ lb. 5.0¢
Galvanized. 21 to 24. $\frac{1}{2}$ lb. 5.50¢
Galvanized. 25 to 26. $\frac{1}{2}$ lb. 6.0¢
Galvanized. 27. $\frac{1}{2}$ lb. 6.50¢
Galvanized. 28. $\frac{1}{2}$ lb. 7.0¢
America. Russia. $\frac{1}{2}$ lb. A. 10¢
Russia. $\frac{1}{2}$ lb. 10¢ @ 11.50¢
American Cold Rolled. B. B. $\frac{1}{2}$ lb. 5.0¢ @ 7.0¢

Iron Wire. See Wire.

STEEL.—DUTY: Ingots, Bars, Sheets, &c., valued at 4¢ $\frac{1}{2}$ lb. or less, 4¢ $\frac{1}{2}$ ad. val.; valued above 4¢ and not above 7¢ $\frac{1}{2}$ lb. 2¢ $\frac{1}{2}$ ad. val.; valued above 7¢ and not above 10¢ $\frac{1}{2}$ lb. 2¢ $\frac{1}{2}$ ad. val.; valued above 10¢ $\frac{1}{2}$ lb. 2¢ $\frac{1}{2}$ ad. val. **Extra.**—Steel Bars, Rods, &c., cold drawn and polished, in the wire size, in addition to ordinary round rolling; 1¢ $\frac{1}{2}$ lb. in addition to above; Steel Circular Saw Plates, 1¢ $\frac{1}{2}$ lb. in addition to the above.

American Cast Steel.
For American Steel, see Pittsburgh quotations.

English Steel.

Best Cast. $\frac{1}{2}$ lb. 15¢
Extra Cast. $\frac{1}{2}$ lb. 16¢ @ 17¢
Circular Saw Plates. $\frac{1}{2}$ lb. 19¢
Round Machinery. Cast. $\frac{1}{2}$ lb. 19¢
Screwed, Cast. $\frac{1}{2}$ lb. 16¢
Best Double Shear. $\frac{1}{2}$ lb. 15¢
Blister, 1st quality. $\frac{1}{2}$ lb. 14¢
German Steel, Best. $\frac{1}{2}$ lb. 10¢
2d quality. $\frac{1}{2}$ lb. 9¢
3d quality. $\frac{1}{2}$ lb. 8¢
Sheet Cast Steel, 1st quality. $\frac{1}{2}$ lb. 15¢
2d quality. $\frac{1}{2}$ lb. 14¢
3d quality. $\frac{1}{2}$ lb. 13¢

TIN.—DUTY: Plates, Sheets, Tagger and Torn, 1¢ $\frac{1}{2}$ lb.; Bars, Block and Pigs free.

BRASS and COPPER WIRE.

Old English Gauge the Standard.—Dis 20. 20.

Common. High. Low. and Bronze.
Brass. Brass. Copper.

All Nos. to No. 16, inclusive.

No. 17, 18. $\frac{1}{2}$ in. 20.25 30.30

19 and 20. $\frac{1}{2}$ in. 27.31

21. $\frac{1}{2}$ in. 35.35

22. $\frac{1}{2}$ in. 39.39

23. $\frac{1}{2}$ in. 42.42

24. $\frac{1}{2}$ in. 45.45

25. $\frac{1}{2}$ in. 48.48

26. $\frac{1}{2}$ in. 51.51

27. $\frac{1}{2}$ in. 55.55

28. $\frac{1}{2}$ in. 59.59

29. $\frac{1}{2}$ in. 63.63

30. $\frac{1}{2}$ in. 68.68

31. $\frac{1}{2}$ in. 74.74

32. $\frac{1}{2}$ in. 80.80

33. $\frac{1}{2}$ in. 85.85

34. $\frac{1}{2}$ in. 90.90

35. $\frac{1}{2}$ in. 95.95

36. $\frac{1}{2}$ in. 100.100

37. $\frac{1}{2}$ in. 104.104

38. $\frac{1}{2}$ in. 107.107

39. $\frac{1}{2}$ in. 110.110

40. $\frac{1}{2}$ in. 115.115

41. $\frac{1}{2}$ in. 120.120

42. $\frac{1}{2}$ in. 125.125

43. $\frac{1}{2}$ in. 130.130

44. $\frac{1}{2}$ in. 135.135

45. $\frac{1}{2}$ in. 140.140

46. $\frac{1}{2}$ in. 145.145

47. $\frac{1}{2}$ in. 150.150

48. $\frac{1}{2}$ in. 155.155

49. $\frac{1}{2}$ in. 160.160

50. $\frac{1}{2}$ in. 165.165

51. $\frac{1}{2}$ in. 170.170

52. $\frac{1}{2}$ in. 175.175

53. $\frac{1}{2}$ in. 180.180

54. $\frac{1}{2}$ in. 185.185

55. $\frac{1}{2}$ in. 190.190

56. $\frac{1}{2}$ in. 195.195

57. $\frac{1}{2}$ in. 200.200

58. $\frac{1}{2}$ in. 205.205

59. $\frac{1}{2}$ in. 210.210

60. $\frac{1}{2}$ in. 215.215

61. $\frac{1}{2}$ in. 220.220

62. $\frac{1}{2}$ in. 225.225

63. $\frac{1}{2}$ in. 230.230

64. $\frac{1}{2}$ in. 235.235

65. $\frac{1}{2}$ in. 240.240

66. $\frac{1}{2}$ in. 245.245

67. $\frac{1}{2}$ in. 250.250

68. $\frac{1}{2}$ in. 255.255

69. $\frac{1}{2}$ in. 260.260

70. $\frac{1}{2}$ in. 265.265

71. $\frac{1}{2}$ in. 270.270

72. $\frac{1}{2}$ in. 275.275

73. $\frac{1}{2}$ in. 280.280

74. $\frac{1}{2}$ in. 285.285

75. $\frac{1}{2}$ in. 290.290

76. $\frac{1}{2}$ in. 295.295

77. $\frac{1}{2}$ in. 300.300

78. $\frac{1}{2}$ in. 305.305

79. $\frac{1}{2}$ in. 310.310

80. $\frac{1}{2}$ in. 315.315

81. $\frac{1}{2}$ in. 320.320

82. $\frac{1}{2}$ in. 325.325

83. $\frac{1}{2}$ in. 330.330

84. $\frac{1}{2}$ in. 335.335

85. $\frac{1}{2}$ in. 340.340

86. $\frac{1}{2}$ in. 345.345

87. $\frac{1}{2}$ in. 350.350

88. $\frac{1}{2}$ in. 355.355

89. $\frac{1}{2}$ in. 360.360

90. $\frac{1}{2}$ in. 365.365

91. $\frac{1}{2}$ in. 370.370

92. $\frac{1}{2}$ in. 375.375

93. $\frac{1}{2}$ in. 380.380

94. $\frac{1}{2}$ in. 385.385

95. $\frac{1}{2}$ in. 390.390

96. $\frac{1$

THE WEEK.

The fact that the announcement of the death of Sidney Gilchrist Thomas, in Paris, on February 1st, could be made in a meeting of the American Institute of Mining Engineers on the 20th of February and be startling news to a majority of those who heard it, may well excite surprise. If some unimportant scion of nobility should break his arm, or some titled snob lose a Jersey favorite cow, the fact would be cabled around the world; but we are left to learn by mail of the death of a brilliant young genius, who, in a short, but eventful, life, has stamped his name indelibly upon the pages which record the industrial history of the nineteenth century. That no correspondent should have recognized in the death of Mr. Thomas an event of international interest would seem to show that it attracted less attention in England than it should, and none at all in Paris. Some explanation of this may perhaps be found in the fact that the British people are now profoundly disturbed by the distressing complications in Africa, but it is inconceivable that the death of a man who has done so much for science, and whose work consummated that for which Sir Henry Bessemer has been so highly honored, should receive so little notice at the hands of the news-gatherers.

According to a statement made by Gen. Charles Roome, president of the Municipal Gas Company, of New York, that company paid the following dividends on \$4,000,000 stock: In 1875, 35 per cent.; in 1876, 15 per cent.; in 1877, 20 per cent.; in 1878, 15 per cent.; in 1879, 10 per cent.; in 1880, 18 per cent.; in 1881, 22 per cent., and in 1882, 1883 and 1884, 25 per cent. In closing their affairs to go into the consolidation the company paid their stockholders 10 per cent.

It is said that with one exception the cotton mills of the Eastern States did business during the last six months of 1884 at a loss, and the exception was where the manufacturers stood well in the export markets.

An immense dam to divert the overflow of the Chagres River in the rainy season is one of the features in the Panama Canal. It is proposed to construct a dam or embankment of earth much resembling an immense railroad embankment, but having a more gradual slope to the sides. The length will be about a mile and the height over 200 feet. Beneath the dam a large culvert or tunnel 50 feet wide will be constructed of solid masonry, which will be sufficiently large to admit the ordinary flow of the river. The inner end of the tunnel will be fitted with strong iron doors, by which the flow of the river from the upper valley can be entirely stopped. At the upper edge of the dam, on the right bank of the river, where it rests against the hill, a channel will be cut, through which the overflow of the dam (in case it ever becomes full) will be carried around the base of the hill to join the channel cut for the diversion of the Lower Chagres on the eastern side of the canal.

Now that iron is fast displacing wood in shipbuilding, the inquiry is frequently heard in the South, Why should not Savannah and Pensacola become great shipbuilding points? Being near to the great iron regions of Alabama, and close to cheap coal and cheap timber, those ports seem to possess every needed advantage.

The English Government has conceded to the colony of Newfoundland the privilege of negotiating directly with the Government of the United States for the renewal of the fishery clauses in the Treaty of Washington, independently of any action or negotiation by the Government of Canada.

A Panama correspondent, speaking of the baneful influence of the climate upon workmen and laborers engaged on the canal, says the skilled artisans from Europe or America are the greatest sufferers. Taking a pride in their work, notwithstanding the advice of their employers they attempt to accomplish as much as they would in a temperate climate, and almost invariably become ill. These drawbacks increase the expense of manual labor. Jamaicans receive from \$1 to \$1.50 per day, which is equivalent to paying a laborer in America between \$3 and \$4 per day.

Wm. C. Kingsley died in Brooklyn on Saturday, 22d, in the 53d year of his age. He was closely connected with the East River Bridge both in its construction and management.

Superintendent McCall's report on fire and marine insurance, made to the New York State Legislature, shows that at the close of the year 1884 the fire, fire marine and marine insurance companies doing business in this State were possessed of \$202,550,110 of admitted assets, a loss of \$2,027,914, as compared with the sum reported the preceding year. The liabilities of those companies excepting scrip and capital, amounted to \$78,070,323, which is \$3,534,837 greater than was then returned. The income of the year was \$101,607,011, and the expenditures \$95,872,656, an increase of \$2,470,055 in income and \$4,704,713 in expenditures, as compared with the previous year. The whole number of companies which reported last year was 171, being four less than reported in 1883.

A committee of the Brooklyn Bridge Trustees has prepared a bill abolishing the present board and vesting the control of the structure in the mayors and comptrollers of the two cities. Wm. J. Osborne was elected to the trusteeship lately filled by Wm. C. Kingsley, deceased.

The cable traction system for street cars in Chicago failed under the recent severe stress of weather.

American capital has been largely invested in British coal mines in Vancouver Island.

The most recent link in the long chain of telegraph lines which is spreading with such rapidity over China is the land line from Shanghai to Canton. A line from Pekin to

Tien-Tsin was opened a few months ago, and the capital of China was connected directly with London. Now the telegraph stretches in an unbroken line from Pekin in the north to the most southern boundary of the Chinese Empire, and a message either from London or Pekin might reach the headquarters of the Chinese forces on the Tonquin frontier in a few hours. Four years ago the only telegraph line in China was one about 6 miles in length, stretching from Shanghai to the sea, and erected to inform the mercantile community of the arrival of vessels off the mouth of the river.

By an explosion of natural gas in Wellsburg, Va., on the 21st inst., seven persons were killed and dwelling-house property destroyed to the value of \$50,000.

Articles incorporating the East River Bridge Company have been filed at Albany. The proposed capital is \$2,000,000, and the tunnel is to be between Ravenswood, L. I., and New York, the terminus in this city to be near First avenue, between Thirty-fourth and Eighty-sixth streets. The tunnel will be 3510 feet long and would pass through trap rock. The estimated cost is \$1,500,000, about one-fifth the estimated cost of the Blackwell's Island bridge.

The estimated losses by fire in this city last year amount to \$3,500,000. More fires resulted from illuminating that from heating.

Mr. Edison has filed a certificate of incorporation for the manufacture of electrical contrivances designed to communicate intelligence between railway trains in motion or between moving trains and stations.

Theo. Masac, a gentleman formerly attached to Jay Gould's office, in this city, has been appointed secretary to President Diaz, of Mexico.

Supt. J. E. Hilgard, of the United States Coast Survey, in reply to the complaints of navigators, informs the New York Pilot Commissioners that there is no deviation in the compass off the southern coast of Long Island, due to the presence of magnetic sands.

A wealthy Cuban shipowner proposes to establish a line of Spanish steamers to ply weekly between Havana and New York.

The new cars of the elevated railroads, in this city, are fitted with a new style of heater, which, it is said, will obviate to a large degree the overheating of the car seats. The device consists of a long boiler-iron tube 4 inches in diameter, which runs along under the seats. In this tube is a smaller one that is wholly disconnected and partly filled with salt water. Steam from the locomotive boiler is let into the outside tube, and, it is said, heats up the car in a few minutes. Then the steam is shut off, and the salt-water tube gives out the heat which it has acquired gradually, keeping the car warm for three hours without additional steam from the boiler. A tin shield is placed above the tubes, so that the seats are not heated by the direct radiation from the heaters, as at present. The inventor of this system says that the old cars are being fitted with this device at the rate of two a day, and that all the cars would therefore be comfortably heated in the winter of 1885-86.

The New York elevated railroad companies no longer seek to evade assessment in New York City, and as their total valuation is computed at \$11,527,354, this yields the city a revenue of about \$300,000 per annum.

The Dominion Government reports 103,824 new settlers in the year 1884, including 9278 from the United States, in regard to which latter item we are told that some little curiosity is excited as to how many of the enumerated laborers are Chinamen.

According to the Mexican *Financier*, the exports of precious metals from Mexico in 1884 were valued at \$33,473,283; other articles, \$13,252,213. Total, \$46,725,496, of which \$21,824,400 went to the United States, and \$19,330,152 to Great Britain.

The great expectations formed last year respecting the direct export trade from St. Louis are not realized. Compared with the previous year there is a heavy decline. The rate on grain per bushel from St. Louis to Liverpool, via river to New Orleans, was as low as 11 cents in October and June, and reached its highest in August—20½ cents. To Liverpool via New York, by rail, was 14½ cents in May and 29½ cents in December.

Messrs. Crawshay & Sons have reduced the wages of their iron-ore miners in the Forest of Dean to about 16/ a week, or, at the rate of 24.4 cents to the shilling, \$3.80 a week. The problem of life which this rate of wages must present to the miners at these mines is one which we hope the wage earners in this country will never have to consider practically.

Michigan lumber merchants propose to make extensive arrangements for the shipment of timber from California and Oregon to the Eastern States. About \$3,000,000 will be invested in forest lands.

The new German import duty on wheat is about at the rate of 8 cents per bushel.

A proposed amendment to the law in New York State designating legal holidays includes Saturday, after 12 o'clock, noon. After that hour the presentation and payment of notes or checks shall cease.

The State Trade and Labor Assembly of Ohio, in session at Columbus, adopted resolutions against license laws in general, against the use of the words "trade unions" by anarchists, disclaiming any affiliation with Nihilist ideas, indorsing the action of Governor Hoagley in not sending troops to Hocking Valley during the strike, asking the General Assembly for night schools for children, protesting against the passage of the law pending in Congress modifying mechanics' lien laws, indorsing the Labor Press

Association and the Eight-Hour law, and requesting the passage of a law making mechanics' liens apply to all trades.

The camphor laurel, a native of China, has been successfully introduced in California, one tree in Sacramento having attained a height of 30 feet. Every part of the wood smells strongly of camphor, and is much favored by cabinet-makers as, besides being light and durable, it drives off all kinds of insects.

The fruit jobbers of this city are considering the advisability of establishing an incorporated exchange. At the same time two existing exchanges, the Petroleum and Mining exchanges, propose to consolidate, and a third is about to expire from inactivity.

It is probable that the Canadian Pacific Railway will soon apply to the Dominion Government for more money, the loan of \$30,000,000 authorized at the last session having proved insufficient.

The destruction by fire on Friday last of the Marvin Safe Company's factory, in this city, a loss was sustained amounting to \$230,000, of which \$100,000 is on 500 or more safes ready for the market or in process of manufacture that were stored in the building. One would suppose that fire-proof safes would be almost as safe fire risks as stone fences or duck ponds.

The Senate Local Committee has advised the purchase of Captain Ericsson's submarine torpedo boat, the Destroyer, for \$120,000.

The German annexation of Samoa is in apparent contravention of international law. The United States have a naval station at the island under treaty stipulations.

Canadian vessels coming into United States ports from ports in Ontario are exempt from the payment of tonnage dues as a result of enforcing Dingley's Shipping bill.

The contracts for the proposed Croton Aqueduct will amount to perhaps \$15,000,000, and the two firms who have got them are said to have formed a syndicate.

The prolonged and disastrous strike among the Hocking Valley miners has suddenly ended, and 2000 men find themselves in a pitiable condition, although in their desperate determination they showed no pity. The collapse was hastened by the reduction of wages in other mining regions, cutting off further assistance from external sources.

The National Association of Stationary Engineers has nearly 70 subordinate associations in various parts of the United States. There are about 9000 stationary engineers in this city, and it is desired to raise the standard of capacity.

In Congress, on the 19th inst., a significant debate took place touching the relative merits of wooden ships and ships of iron or steel. Mr. Keifer proposed to strike out the clause in the Naval bill appropriating \$400,000 for the completion of the wooden ship New York, now on the stocks in the Brooklyn Navy Yard, which was begun in 1865, and upon which no work has been done for 19 years. Mr. Hewitt, of New York, thought it was preposterous for the country to undertake to build or finish a wooden ship. Mr. Hutchings, of New York, said it was not the policy of the country to build wooden vessels, but this one should be finished as a temporary expedient. Similar views were expressed on either side. Finally, the vote to strike out was lost.

The total immigration during the year ending June 30, 1884—518,592 persons—was composed as follows:

	Males.	Females.
Professional occupations	9,184	100
Skilled occupations	50,905	4,156
Miscellaneous occupations	160,159	24,068
Without occupations	95,261	181,791

A. G. Lewis, boat builder, who is prepared to build light-draft steamers in sections, ready for transportation to the Nile,

says that, excepting the concern at Yarrow,

there is no establishment in Europe at all

comparable with works in the United States

engaged in this line of enterprise. Boats

182 x 62 feet and drawing 2 feet of water

can be made to run from 10 to 16 miles an hour.

Captain Samuels, who commanded the famous clipper ship Dreadnaught, takes exception to the proposed expenditure in deepening the harbor of New York, claiming that the money could be better expended in the encouragement of American shipping.

He says: "It is just like the cool cheek of the English to ask us to give them 30 feet at mean tide, in order that they may cross our bar at any time. Do they not have to wait till the tide is near three-quarters flood before they can enter the Mersey at Liverpool?

Mr. Bryce, the celebrated Clyde shipbuilder,

says that the excuse for building deep ships

is because their dock gates will not admit of ships of greater beam, and we are asked to

deepen our harbor to suit their notions in shipbuilding.

Let them deepen their bar and widen their dock gates before they ask us

for a more convenient ingress to New York.

It is certain the difficulty is not wholly

with New York Harbor. The old pilot John McGinn, who 65 years ago brought in ships

drawing 30 feet of water, says he could do so

now with 10 feet of water.

California during the past year has reaped

golden harvests. Of wheat alone she had

55,000,000 bushels, and of barley, corn and

oats, 35,000,000 bushels; 15,000,000 gallons of

wine, and of wool, 42,000,000 pounds; hops,

42,000 hales; beans, 20,000 tons; honey,

9000 tons. Had prices been up to the average

of past years, California producers would have prospered wonderfully.

Mexicans are sending large orders to

American and European manufacturers in

anticipation of the increased tariff, which

takes effect July 1.

Charleston, S. C., is about to undertake

the driving of the deepest artesian well in

the world. It will be driven in the main

part of the city, and, as it is expected to furnish 4,000,000 gallons of water a day, it is calculated, with two similar wells already down, to furnish a sufficient supply of water for the entire city for many years. The new well will be 2000 feet deep, will be at least 6 inches in diameter at the bottom, and is to be completed by next August.

The use of the telephone in agriculture is being tried in France. A large land owner in the Department of the Loire has established a regular circle of telephonic communication throughout the whole of his estates, using the largest trees as stations, and thus can simultaneously direct operations in all parts of his domain.

The newly-appointed building inspector for New York is ordering sweeping alterations in hotels and theaters, including fire-escapes and brick arches or iron griders, the latter to be built between the stage and auditorium.

British trade with India is suffering from the depreciation of silver. This metal being the principal medium of exchange, manufacturers are unable to realize their usual profits, and as a consequence are suffering from extreme depression.

Extensive shipments of cattle from ranches in Nebraska, Wyoming and Montana will be made to England via the Northern lakes during the coming season. The company chiefly concerned represent that they can be entered duty free.

It is reported from Albany that, instead of having self-supporting prisons, tax payers will be compelled to expend \$1,000,000 annually for their support, now that labor contracts are abolished.

The House Committee on Commerce decided to report a bill authorizing the registration of certain steamships as vessels of the United States, to be known as the "American Express Steamship Company," with a capital of \$10,000,000. They are to ply between Fresh Pond Bay, on Long Island, and Milford Haven, in Great Britain, and are to have a speed of 18 knots an hour.

Arrangements are making to concentrate the Hocking coal lands in Ohio under one management the coming spring. A single company now hold 12,000 acres.

A Petition from the Mechanical Engineers.

The following is the text of the petition recently submitted to the Senate from the American Society of Mechanical Engineers:

To the Senate and House of Representatives of the United States in Congress assembled.—The American Society of Mechanical Engineers, on behalf of the inventors, engineers, mechanics and promoters of the industrial arts in the United States, many of whom are members of this society, would most respectfully petition that the affairs and condition of the United States Patent Office may be considered and investigated at your earliest convenience. The funds now raised by direct taxation from the inventors of the country, more than \$3,000,000 of which have already been directed from their intended channel, are more than sufficient to maintain the office in a condition of the highest efficiency; but partly by the reason of their diversion, the work of the office is greatly in arrears, and the rights of those by whom this tax is paid are thus most unjustly impaired.

To remedy these evils we respectfully submit that the efficiency of the Patent Office should be at once increased to an extent which will enable it promptly to bring up its work to date, and to conduct it hereafter with no delays other than are necessary to its proper performance, and we particularly urge that adequate provision be made for securing for the position of Commissioner of Patents a degree of talent and ability proportionate to its important function. This position involves executive and judicial duties of the highest order, and is fully commensurate in importance with those of the judges of the United States Courts. We respectfully submit that the compensation and tenure of this office should be placed upon a basis which will command the services of men of the best ability and of the highest legal attainments. In our judgment reform in this particular is not only more urgent than any other, but if effected will in due time result in accomplishing all others that are needed, by providing, first, for the proper and efficient administration of the Patent Office, and, second, for the placing before Congress of information and recommendations for further improvements of a kind and from a source which will command its confidence, and will thus facilitate such further legislation as may be required; and your petitioners will ever pray.

J. F. HOLLOWAY, President.
R. H. THURSTON, Past President.
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JOHN E. SWEET, Past President.
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J. FRITZ, Past Vice-President.
HENRY NORTON.

The Gun Foundry Report.—The demand for the report of the Gun Foundry Board has been so great that the House of Representatives has authorized the printing of another edition. This board, it will be remembered, was organized under act of Congress March 3, 1883, composed of six officers selected from the army and navy for the purpose of examining and reporting to Congress which of the navy-yards or arsenals owned by the Government has the best location and is the best adapted "for the purpose of establishing a gun foundry board for the manufacture of heavy ordnance adapted for modern warfare." In the course of its investigation the board visited England, France, Russia and Germany, and collected most valuable and important information.

On February 18 Messrs. P. H. Miller and John R. McCune, trustees of Graff, Bennett & Co., issued the following circular to the creditors of the firm: "We have been notified by Messrs. Graff, Bennett & Co. that they are unable to meet the bonds due February 20, issued under their extension. After having promptly paid the first four installments of their indebtedness we very much regret their inability to meet their further engagements as they mature, but the present condition of the iron trade seems to make it impracticable. To foreclose the mortgage and sell the mills under present conditions would be alike disastrous to debtors and creditors, and some of the larger creditors are informally considering the propriety of a further extension of time. It is probable that a formal meeting of creditors generally will be held within a few days, of which you will have due notice." Rumors of an action of this nature being contemplated have been on the street for some days, but neither the trustees nor members of the firm would talk about them, taking the ground that it was a matter of private business. Since the extension was granted to the firm, from \$600,000 to \$700,000 have been paid, and the present depressed state of trade is reported to be the reason for asking for an extension on the payment that will soon be due. It is said, too, that the firm desires to consolidate all its debts into one loan. No trouble is anticipated, as it is expected that the creditors will readily accede to the request.

Commodore Walker, chief of the Bureau of Navigation, has prepared for publication a paper in relation to the variations of compasses caused by magnetism of iron and steel ships. A testing-house will shortly be built in which to examine and test all the compasses of the navy, and such of those in use in the merchant service as the owners thereof may desire. There is no location in New York Bay practicable for a compass station, and therefore one was established last November in Narragansett Bay.

By the passage in Congress of the Texas Pacific Forfeiture bill, which will doubtless be signed by the President, 15,000,000 acres of land, valued at \$40,000,000, will be restored to the public domain.

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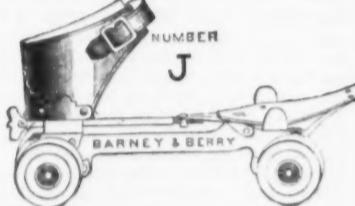
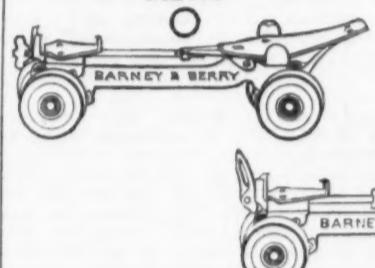
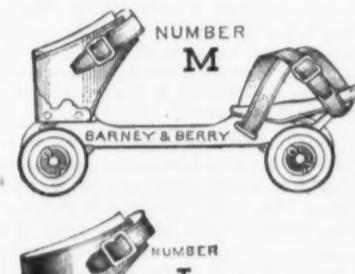
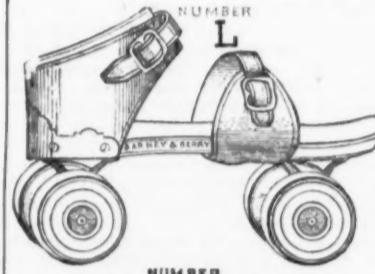
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This Wrench not only combines the superior qualities of a Gas Pipe Wrench, but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.

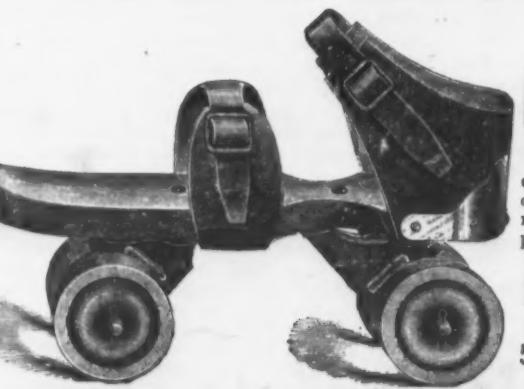


No. 3 PATENT PIPE WRENCH.

The serrated jaws of the Wrench are interchangeable; that is, the serrated plate may be used for either the stationary or sliding jaw, so that if one plate is broken or worn, the other may be used. The plates are also interchangeable, thus easily repairing the Wrench at very small expense, and with as perfect practicability for further use as when the Wrench was new.

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This Wrench can be furnished with long Nut or Sleeve.

February 26, 1885

THE IRON AGE.

33

LATEST LEGAL DECISIONS.

FIRE INSURANCE OF STEAM POWER ELEVATOR AND BUILDINGS.

C. sued to recover for the loss of an elevator building and additions. The fire occurred on September 20, the notice of loss was sent by telegraph on September 20, the proofs of loss were made on December 22 and the action was begun on December 24. In the terms of the policy the loss was to be forthwith notified to the company, and a particular statement made in writing as soon as may be, "under oath, and all losses shall be paid within 60 days after the first meeting of the Board of Directors or Executive Committee held subsequent to notice as aforesaid of such loss." Also, "it shall be optional with the company to repair, rebuild, &c., giving notice of such intention within 30 days after the receipt of proofs herein required." The Executive Committee met twice in each month. The company defended on two grounds: 1. That it was not liable for the loss of a warehouse within 2½ feet of the elevator, which was fastened to the elevator by 20 strips of board. (This warehouse was used exclusively for storing grain, which was received first into the elevator and then spouted into the warehouse through two spouts which extended from one building to the other, and the grain was taken from the warehouse by a conveyor running under the warehouse and elevator. This warehouse was not used except for and through the elevator.) 2. That the action was prematurely brought, there being no

amount due by W. to M. was a definite sum, and when a certain sum is due on a contract a recovery can be had upon a promise by a third person to pay it. The suit will be sustained on the promise; it need not be brought as upon contract, but as for money had and received to the plaintiff's use."

STATE INSOLVENT LAWS.

N. sued H. for a debt. They were citizens of different States, and H. having been discharged under the insolvent laws of his own State set up that discharge in defense of the suit. It was admitted that N. did not appear in the insolvency proceedings; did not prove his demand against H. therein, or in any way share or participate in the distribution of the estate surrendered. N. argued that this defense was not sufficient to defeat his claim, and the court decided in his favor. The case—Newton vs. Hagerman—was carried to the United States Circuit Court for the District of Nevada, where the court below was sustained. Judge Sabin, in the opinion, said: "The question raised here is this: What, if any, extra-territorial force or effect have State insolvent laws? If these laws have no force or effect beyond the limits of the State, and are applicable only to contracts between citizens of the State made subsequent to the passage of the insolvent laws, then the matter pleaded in the answer are a bar to plaintiff's recovery in this action. We consider it settled in the Federal and State courts that the insolvent laws of one State cannot discharge the contracts of citizens of other States, because they have no extra-territorial operation,

As a basis for legislation on the subject this report is of much value, and it is to be hoped that such laws will be passed as will conduce to a better sanitary condition of the homes of the poorer classes. But, while undoubtedly there are many evils which demand State correction, the greatest reform needed is the effectual enforcement of existing laws, which at present are too little regarded.

New Milling Machines.

The accompanying engravings illustrate what is known as a No. 2 plain milling machine, built by Mr. F. E. Reed, of Worcester, Mass. It is a very heavy and substantial tool. The bed is 16½ inches wide and 6½ inches deep. The spindle is of hammered steel, mounted on a heavy square slide, which is jibbed to both sides of large upright, and is raised or lowered by a single screw. It is held in position by ¼-inch bolts, and has a stop-screw under each end of slide. By this arrangement the greatest rigidity and accuracy are secured. The spindle gear is 16½ inches diameter, and driving gear on cone shaft is 4 inches diameter. The gears are connected by a yoke, and are not thrown out of gear by adjustment of spindle. The table is 33½ inches long and 7 inches wide, and has an automatic feed motion adjustable at any point. The vertical adjustment of the spindle is 8 inches. The counter-shaft has tight and loose pulleys, 12 inches diameter, and should make 125 revolutions per minute. The cone

proper condition. They refer to this as an important improvement over other mowers which provide for taking up the wear in but one direction. The "Acme" is geared, it will be seen, at both ends, and cuts to within 1 inch of each extreme outside end. The traction rolls run inside the frame of the machine, and thus, the manufacturers say, do not roll down the grass like a side-wheel machine. The pawl and ratchet used in the "Acme" is referred to as an entirely new principle in pawl and ratchet motion, and as being silent, positive and durable. The handle is a vibrating one, and may be in

wrench in combination with a similar curve reversed, which characterizes the moving part. The end of the shank is serrated, thus avoiding liability of slipping. The wrench is adapted for turning round, square, oval, octagonal, hexagonal and all other shapes, and is guaranteed by the maker not to slip. It is positive in its hold on pipe. The wrench is made by the drop-forging process from steel, and is said to be tempered to stand hard use. Its range covers all that a wrench is commonly used for. From the price list before us we learn that six sizes are made, ranging from 10 inches up to 30 inches. The



The "Climax" Pipe Wrench.

stably attached or detached from the mower for convenience in storing, and is provided with a half-lock which allows of the knives being raised to avoid accident when being drawn to and from the lawn. A brace extends, it will be perceived, across the front of the mower and prevents the knives from coming into contact with trees and other obstacles. A center traction roll provides for keeping the mower level while cutting narrow borders. The arms of the front truck-wheels encircle the journals of the cutting cylinder, giving, the manufacturers claim, the greatest possible range in height of cut. The whole machine is described as firmly and strongly built, every part being made to gauge and with interchangeable parts, and is put on the market by the manufacturers with high claims for its excellence. We may add that other styles of these mowers are represented in the company's advertisement on page 34.

The Harvard Roller Skate.

The accompanying illustration, Fig. 1, gives a general view of the Skate above named, which is manufactured by the Harvard Roller Skate Company, 235 Washington street, Boston, and Fig. 2 a sectional view of the rocker and adjustable box which holds the cushion. To this construction, which is covered by a patent dated March 4, 1884, the manufacturers direct special attention as constituting the principal novel feature of the skate. A section of the box holding the rubber cushion is shown in this cut, to understand the operation of which it is to be remembered that the upper portion of the box is movable, sliding up or down according to the motion of a wedge between it and the foot-plate of the skate above it. This wedge and the screw by which it is operated are not represented in the sectional view, but can per-



The "Boss" Ash and Garbage Can.

shown, of strips of galvanized iron fastened together at the edges by folded ribs. The bottom is of a single sheet, flanged and riveted to the sides, and is strengthened by two strips of iron crossing at the middle. The can, for greater strength, is made somewhat bulging, in the form of a barrel, instead of having straight sides, as is the usual method. For convenience in moving, handles are riveted to the sides, as shown in the cut. In the garbage-cans all the seams are soldered, so as to make them water-tight. The cans are made in four different sizes of black japanned and galvanized iron, and, where desired, covers are provided at a small additional cost. In our Trade Report, in another part of this issue, we publish the prices of the different sizes and styles of these cans.

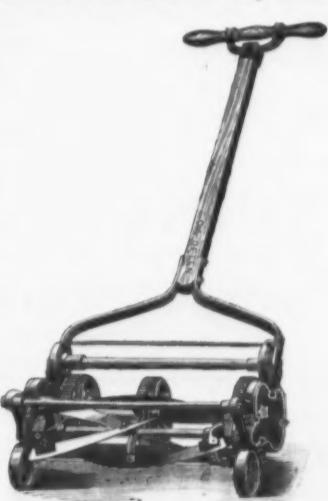
Results of the French Bounty System.

As having a direct bearing on the question of ocean mail subsidies, we again refer to the French bounty system, which went into operation about four years ago, and is now made the subject of an official report. The first effect was to stimulate shipbuilding far in excess of commercial requirements. Thus, in 1880, before the passage of the law, the long-voyage tonnage under the French flag was 3,633,078, but by the end of December, 1882, or during the first year of the bounty system, it had increased to 4,722,796—a gain of 1,089,718 tons, the profits, as a rule, going to the British shipbuilder rather than to the French. The returns down to January 1, 1884, show that the total bounties paid during the previous two years was 16,700,000 francs, or about \$6,175,000. Nearly 13,000,000 francs, or over three-quarters of the whole sum, was taken by the iron ships, steam and sail. Of these, 92 steamers and 32 sailers were built in Great Britain, and there were some few from other countries. Evidence of the failure of the system is beyond dispute. A London correspondent of the *Times*, writing on the 1st of last month, says: "The full extent of this failure cannot be told until the returns for 1884 are at hand, but from the report of a single company, the Chargeurs Reunis, some idea can be gained. In the two years immediately preceding the operation of the bounties law, this company, which has over a score of steamers in the South American trade, earned dividends of from 3½ to 4½ per cent. In 1882, the first year of the law, the dividend rose to 15 per cent., and in 1883 it was 12½ per cent. This year the stockholders are told that it will be impossible to pay any dividend whatever, notwithstanding the fact that the line must have received between \$300,000 and \$400,000 in bounties from the Government during the year." In the light of the facts the United States

are not likely to repeat the blunder of a bounty for tonnage, whatever may be the final decision in respect to our decaying mercantile marine. That heroic treatment of some kind may be called for none can deny.

The "Acme" Lawn Mower.

The Blair Mfg. Co., Springfield, Mass., for whom Louderback, Gilbert & Co., 33 Chambers street, are agents, are putting on the market the "Acme" Lawn Mower, which is represented in the accompanying illustration, which shows one of their medium sizes. Of this mower for hand use they make the



The "Acme" Lawn Mower.

following sizes: 10, 12, 14, 16, 18, 20 and 24 inch. The 14, 16, 18 and 20 inch have a roller in the middle, as represented in the cut, for the purpose of supporting the machine for cutting borders. The 10 and 12 inch have a roller at each end, without the middle roller, and the 24 inch have double traction rollers in the middle. In putting this lawn mower on the market the manufacturers refer to the quality of material and workmanship, and direct attention to the following points in its construction: The cutting cylinder is made with four spiral knives instead of three, as in other mowers, a feature to which they refer as having important advantages. The shaft of the cutting cylinder is of steel, and it is described as having bearings which are capable of such adjustment that, no matter how much worn the shaft becomes, the lost motion in all directions may be taken up and the bearings always kept in

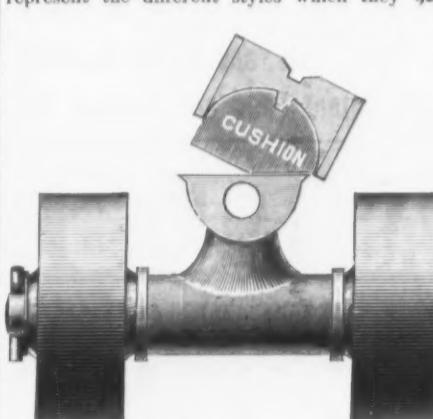


Fig. 2.—Sectional View of Rocker and Adjustable Box.

put on the market, and call attention to other features of excellence which they claim in the skate.

The "Climax" Pipe Wrench.

The accompanying engraving represents a very efficient Pipe Wrench which is being introduced by John G. Maynard, No. 12 Cortlandt street, New York. It will be seen that the hold or grip on the pipe is obtained by the peculiar curve given to the shank of the

Lieutenant Schwatka, speaking of Alaska, says the fur company, which virtually controls that territory, is making enormous profits, and that the whale fishery alone is worth \$1,000,000 per annum.

right of action until 60 days after the meeting of the directors or Executive Committee subsequent to the service of the proofs of loss. (There was no suggestion that the proofs of loss were not made in time.) The company was defeated and carried the case—Cargill vs. Millers' and Manufacturers' Mutual Insurance Company—to the Supreme Court of Minnesota, where the judgment was affirmed. Judge Dickinson, in the opinion, said: "1. The warehouse served the same purpose, and no other, than as a bin in the elevator building. It was used as a part of the elevator, and was so connected with it that, in view especially of this use, it must be considered as having been intended by the parties to be included in the designation 'elevator building and additions.' 2. The notice of the loss, which the insured is required by the policy to give in writing 'forthwith' upon the occurrence of a loss, and the statement or proof of loss to be rendered 'as soon as may be' are distinct. The one is essentially a notice, and is so designated in the requirement to 'notify' the secretary; the other, which in the policy is called a statement, is not of the character of a mere notice. In the law of insurance it has come to be known as the 'proofs of loss' or 'preliminary proofs,' and is elsewhere in the policy referred to as 'the proofs herein required.' The most natural, if not the necessary, construction of the instrument is to read the words 'notice as aforesaid of said loss,' as referring to the notice of loss, and not to the proofs of loss. This conclusion is further supported by the principle which requires us to construe liberally in favor of the insured those provisions of the contract made for the benefit of the insured and expressed in a form deliberately selected by it."

CONTRACT—AGREEMENT TO PAY THE DEBT OF ANOTHER.

W. was indebted to M. and a lumber company were indebted to W., who requested them to pay M., who released W. from his debt, and the company charged the amount on their books to W. The company refused to pay M., claiming that as they had not made the promise to pay the debt in writing they were not bound. M. got judgment, and the company appealed—the case—Malcrone vs. American Lumber Company—to the Supreme Court of Michigan, where the judgment was affirmed. Judge Champin, in the opinion, said: "This transaction was valid and rests upon a sufficient consideration. It was a mode of paying W. so much on account of his contract with the company. M. does not rely upon the request of W. to pay, but upon the company's agreement to pay, which made a new contract between them—novation. The statute of frauds, requiring the promise to pay the debt of another to be in writing, has no application to a case like the present. The rule is well settled that where a party who was not before liable undertakes to pay the debt of a third person, and, as a part of the agreement, the original debtor is discharged from his indebtedness, the agreement is not controlled by the statute of frauds. The

and, consequently, the tribunal sitting under them, unless in some cases where a citizen of such other State voluntarily becomes a party to the proceedings, has no jurisdiction in the case. Legal notice cannot be given, and, consequently, there can be no obligation to appear, and, of course, there can be no legal default. The debt attends the person of the creditor, and, unless he is within the jurisdiction of the court, no discharge granted by it can affect his rights. It is a question of citizenship, and State courts and State laws are powerless to affect the rights of non-resident creditors by any jurisdiction they may have or exercise over the person of the debtor, or by any proceedings in rem affecting the debt itself."

RAILROAD—EJECTION.
B sued a railway company for damages for being ejected from its train by a conductor. It appeared that he got on the train to go to another way station without a ticket, expecting to pay 20 cents, as he had done before, but, on being told that he must pay 10 cents more on the train, he said he ought not to be required to pay so much, and, in a good humored manner, said to the conductor that he would get off if he would stop the train. The conductor immediately pulled the bell-cord, and though B offered the fare demanded, at once, and before the train stopped, he forced him to leave the train. B. had a judgment, and the company carried it—Texas and Pacific Railroad Company—to the Supreme Court of Texas, where it was affirmed. The Chief Justice (Willie), in the opinion, said: "B was not a trespasser. The difference between him and the conductor was in discussion only. He was bound to accept the fare if tendered before B. had to leave the train."

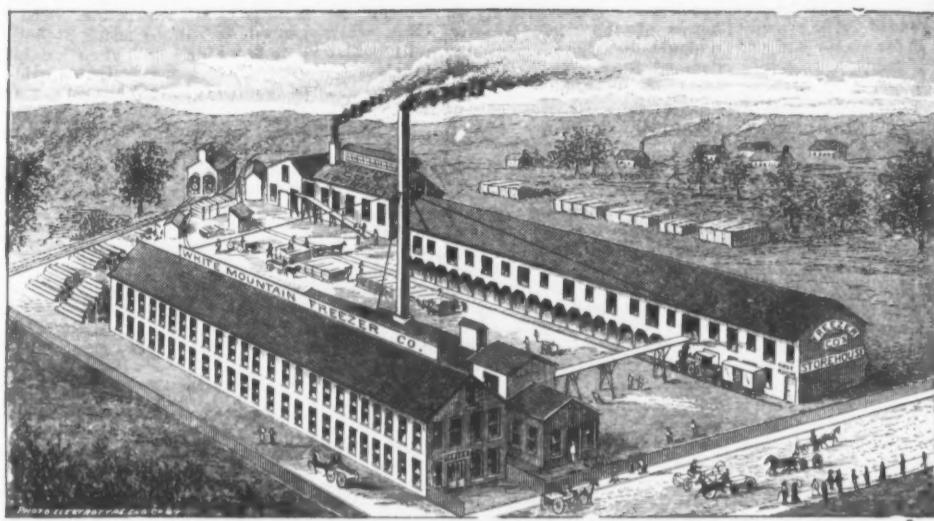
THE TENEMENT HOUSE COMMISSION.
The report of the Tenement House Commission, presented a short time ago to the New York State Senate, comprises a series of documents covering the result of the inspection of nearly 1000 tenements out of an estimated total of 26,000 in New York. The percentage in tenements of the total number of deaths in the city, which has increased from 51.11 per cent. in 1870 to 56.50 per cent. in 1884, sufficiently explains the necessity of some reform in this matter. In a supplementary report by the chief inspector, Mr. Frederick M. Owen, it is stated that the number of tenements needing an inspection of plumbing is very large, and that it is impossible to make owners or tenants obey sanitary laws without systematic inspection, which it is impossible to have with the present small force of inspectors of the Health Department. The report says that the tenants generally appreciate the necessity of sanitary regulations, and that they are more advanced than would be judged from their surrounding conditions. While in their present state the tenement-houses, in the vast majority of cases, are sadly in need of reform, it is encouraging to be told that the sanitary condition of the older houses has greatly improved during the past five years.

White Mountain Freezer Co.



NEW PLATFORM FREEZER.

Sizes, 15, 20 and 25 quarts.



THE LARGEST FREEZER WORKS IN THE WORLD.



POWER FREEZER.

Ready to operate. Sizes, 25 to 50 quarts.

ICE CREAM FREEZER

Buy Sands' Triple-Motion "White Mountain."

The only Freezer ever made or patented having three motions. Can turning one way. Outside Beater and Cream Scraper combined, with floats extending to center, turning opposite to Can. Inside Beater, with floats extending outward, turning opposite to Outside Beater, thereby making three simultaneous motions, and producing fine, smooth cream.

White Mountain Freezer
Ready to Operate.

Sizes, 2, 3, 4, 6, 8, 10, 15, 20, 25 and 50 quarts.

It is Utterly Impossible for any Single-Beater Freezer to Produce the Same Results.

They freeze quicker than any other on the market, thereby saving time, ice and salt. The Tubs are chemically filled and are Water-Proof.

NO ZINC IN CONTACT WITH CREAM, BUT TIN INSTEAD. OXIDE OF ZINC IS A WELL-KNOWN POISON.

"Never put anything into the Human Stomach prepared in vessels coated with Zinc." — *The Metal Worker*.

All Outside Irons Galvanized. Packing Tubs and Cans, All Sizes, Wholesale and Retail

Sold by the Trade everywhere. Send for Circular and Price List of the Celebrated Freezer. Address

WHITE MOUNTAIN FREEZER CO.,

101 East Hollis Street,

NASHUA, N. H.



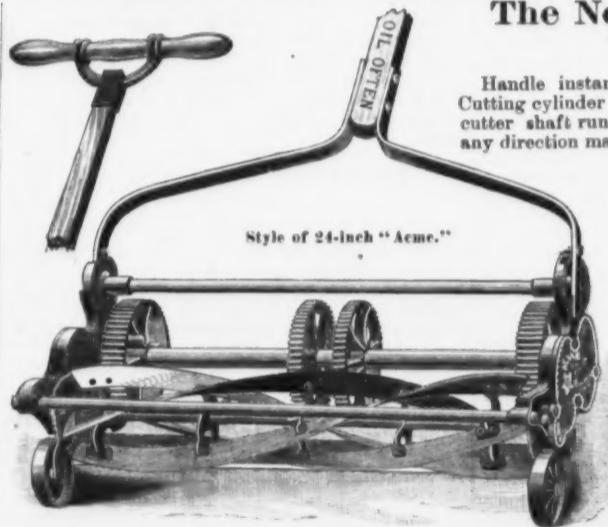
Sands' Family Ice Crusher.

BLAIR MANUFACTURING COMPANY, SPRINGFIELD, MASS., U. S. A.

The New "Acme" Lawn Mower.

THE IMPROVED
"Easy" Lawn Mower.Catalogues and Price Lists on
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E. H. Bristol & Gale, Chicago, Ill.
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T. & A. Pickering, Cincinnati, Ohio.
Hildebrand & Furate, Indianapolis, Ind.
Seebold & Parker, Pittsburgh, Pa.
Frank C. Porter, Buffalo, N. Y.
Geo. B. Bahr & Co., Louisville, Ky.
Geo. W. House & Son, Peoria, Ill.
Samuel G. B. Cook & Son, Baltimore, Md.
Farwell, Johnson & Jackson, St. Paul, Minn.
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B. L. Kratz & Co., Springfield, Mass.
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MERITS OF CONSTRUCTION:
Handle instantly attached or detached without touching the Mower.
Cutting cylinder has four knives, all tempered to a standard. Steel cutter shaft running on Steel gibs so arranged that all possible wear in any direction may be compensated for. Patent cam pawl and ratchet, absolutely positive, silent and durable. Truck wheels run on hardened steel studs, protected from dirt, &c. Truck arms encircle cutting cylinder journals, giving greatest possible range in height of cut. Powerful traction. Perfectly silent. Easily operated. All sizes geared at each end. Every part made to standard gauges, and interchangeable.

RANGE OF WORK.

Cuts high terraces with rope attachment, cuts borders, cuts mounds, cuts over holes, cuts within one inch of a wall, fence or tree. Cuts wet grass without clogging. Cuts heavy, tough grass with comparative ease, and especially adapted to cemetery work.



MECKLENBURG IRON WORKS, CHARLOTTE, N. C., JOHN WILKES, MANAGER.

MANUFACTURERS OF

Stamp Mills and Pumps for Gold Mines, and Mining Machinery of every description; Steam Engines, Portable and Stationary; Boilers and Saw Mills, with Reamy's Patent Feed and Backing Device. Also Manufacturers of the Celebrated Centennial Cotton Press.

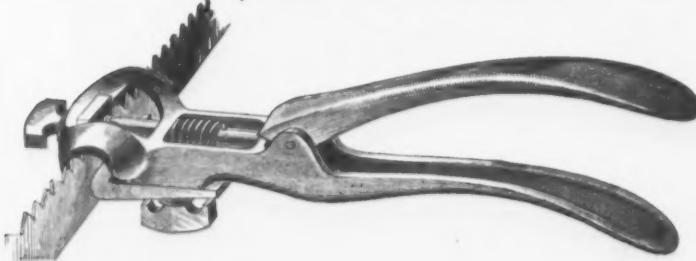
BEST CAST TRADE BROWN MARK TOOL STEEL

BROWN & CO.
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TEMPLE & LOCKWOOD, 12 Platt Street, New York, Agents.

MORRILL'S PERFECT SAW SETS AND BENCH STOP

FOR SETTING EVERY VARIETY OF SAWS.

For price lists
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AddressASA FARR,
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RIVERSIDE IRON WORKS,

MANUFACTURERS OF RIVERSIDE

STEEL NAILS

Pig Iron, Bar Iron, Bar Steel, Steel Blooms, Steel Billets, Small T Rails, Flat Rails of Iron or Steel, Fish Bars of Iron or Steel.

Wm. Rogers' German Silver and Plated Spoons and Forks. Send to SIMPSON, HALL, MILLER & CO., Branch Houses: 36 East 14th St., New York; 104 Commerce St., Philadelphia, Pa.; 160 State St., Chicago, Ill.

Factories:
Wallingford, Conn.

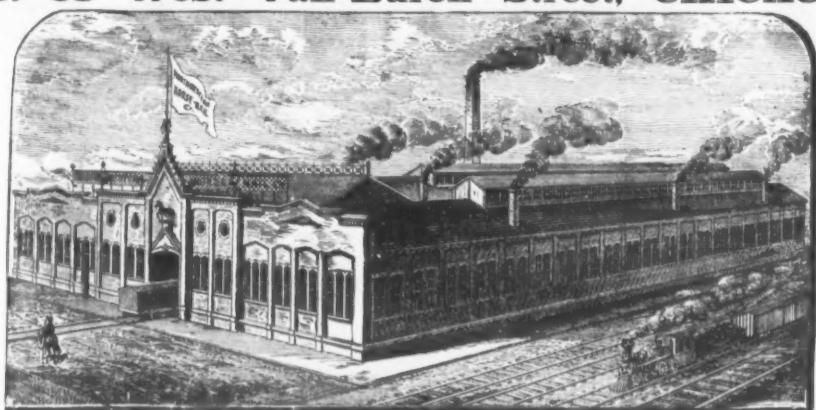
Simpson, Hall, Miller & Co.

NORTHWESTERN HORSE NAIL CO.,

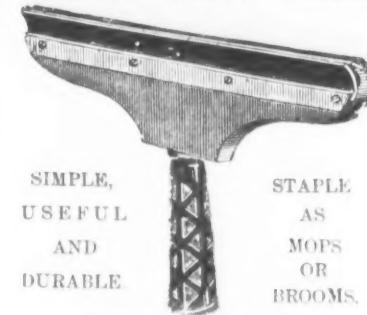
NO. 68 West Van Buren Street, CHICAGO.

Regular Head.

OUR NAILS are manufactured from the finest brand of Swedish Iron, of which we use the entire product.



PERFECTION WINDOW CLEANER.



SIMPLE,
USEFUL
AND
DURABLE

Beware of Infringements.

City Head.

IN QUALITY, uniformity of shape and style, they are unequaled.

They are the safest nail to drive.

For Sale by All the Leading Houses Throughout the United States.



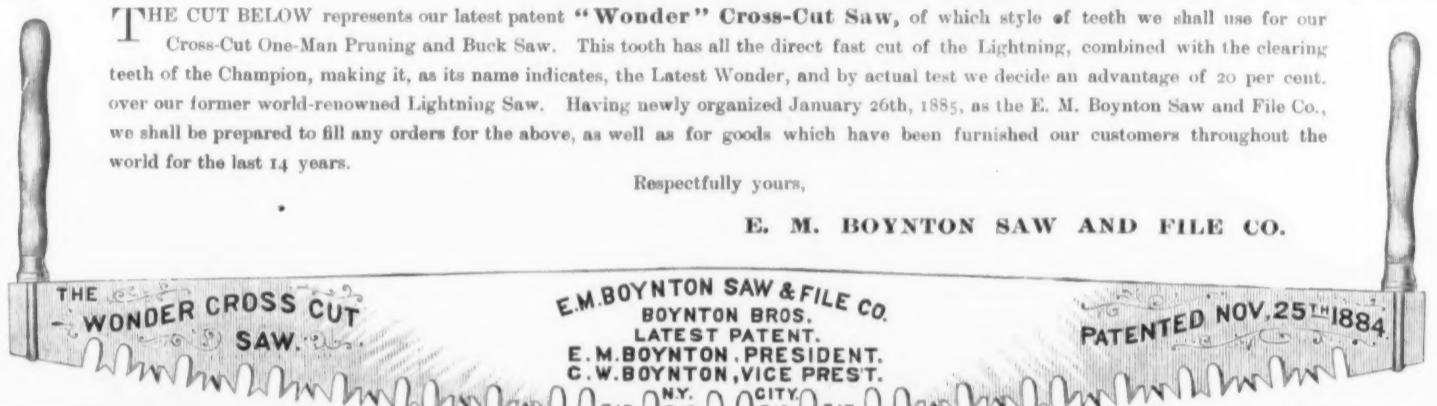
COLD TEST OF IRON USED EXCLUSIVELY BY NORTHWESTERN HORSE NAIL CO.

A. W. KINGSLAND, Secretary.

THE CUT BELOW represents our latest patent "Wonder" Cross-Cut Saw, of which style of teeth we shall use for our Cross-Cut One-Man Pruning and Buck Saw. This tooth has all the direct fast cut of the Lightning, combined with the clearing teeth of the Champion, making it, as its name indicates, the Latest Wonder, and by actual test we decide an advantage of 20 per cent. over our former world-renowned Lightning Saw. Having newly organized January 26th, 1885, as the E. M. Boynton Saw and File Co., we shall be prepared to fill any orders for the above, as well as for goods which have been furnished our customers throughout the world for the last 14 years.

Respectfully yours,

E. M. BOYNTON SAW AND FILE CO.



FLOOR SCRUBBERS.

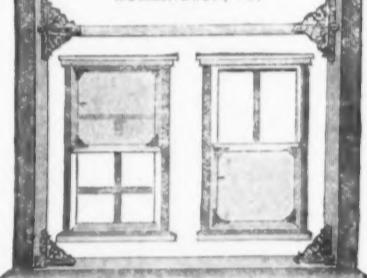


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205 KINZIE STREET,
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The best and only complete arrangement for Window and Door Screens ever invented. No mortising or tenoning; cannot sag or warp, and any one can make them.

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Berea & Huron Stone Company,
Manufacturers of

GRINDSTONES,
MOUNTED STONES,
SCYTHE STONES, &c.

OFFICE: 71 & 72 Wifshire Building, CLEVELAND, OHIO

Walter R. Wood
GRINDSTONES,

Berea, O., Nova Scotia, & other brands.
288 and 289 Front Street, New York.

GEO. CHASE,
The largest manufacturers in the world of

OIL STONE
Of all description.
107th Street and Harlem River,
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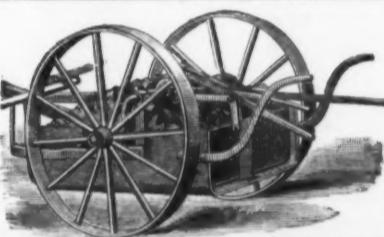
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OHIO GRINDSTONE COMPANY.

H. H. Clough, Pres. L. P. Haldeman,
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MANUFACTURERS OF
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OF ALL KINDS.

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HASLUP'S PAT. WHEELED SCRAPER

Has great advantages over all others. It has
More Capacity and is Easier Handled by Man and Team.
Good on long or short hauls. Three sizes: 9, 13 and 16 cubic feet.

BEAT all others for capacity, durability, strength, light draft. Being ALL STEEL (except wood handles), are lighter, stronger and better made than any other. 3 sizes. Also, Township and Rail-road Plows.

SIDNEY STEEL SCRAPER CO., Sidney, Ohio.



BIT BRACES.

No. 6.
No. 8.
No. 10.

The Amidon Pat. Corner Brace
bores into a corner or against the wall much
faster and easier than the Ratchet Brace, and easier in the clear,
does just as good work, and easier in the clear,
as the ordinary Brace.

AMIDON & WHITE,

SOLE MANUFACTURERS OF

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CORNER BRACE,
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IMPROVED RATCHET BRACE,
BUFFALO BALL BRACE.

FULL NICKEL PLATE OR PLAIN FINISH.

We are the SOLE OWNERS AND MANUFACTURERS of each of the above-named styles, and hereby caution the trade against purchasing the Barker Brace, or any other of our make, from any other manufacturer, both to insure from very inferior goods and from infringing on our patent rights.

No. 8.
No. 10.
No. 12.AMIDON'S
BARKER
IMPROVED
BRACE.

The Barker Improved Brace is too well known to require any further mention. The Universal Brace is newer, and is positively the best cheap Brace in the market, as it centers any sized Bit, and holds perfectly secure by a Cold Chisel Thumb-Screw.

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135 and 137 Main Street, Through to 10, 12 and 14 Quay Street, BUFFALO, N. Y.
W. H. COLDEY, N. Y. City Agent, 103 Chambers St.



THE F. WILSON PATENT Grinding Mill,

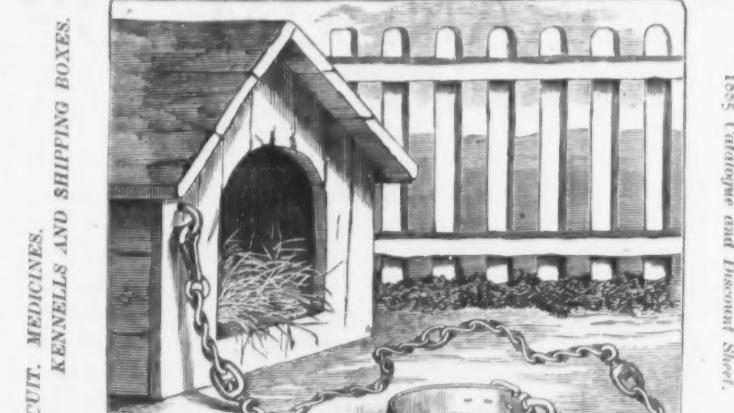
FOR
Pulverizing Old Fire Brick, Grinding Raw
Bones, Green or Dry, and
Other Substances.

Descriptive Circular upon application.
WILSON BROS.,
Sole Manufacturers,
EASTON, PA.

PHILLIPSBURG, N. J., Nov. 3, 1884.
MESSRS. WILSON BROS., EASTON, PA.
Gentlemen: I beg to inform you that your
chaser from me for grinding old fire
brick answers the purpose admirably,
and I cheerfully recommend it as a
very effective machine. Yours truly,
JOSEPH KENT,
Sup't. Andover Iron Co.

Double
Acting
Spring
BUTTS SABIN'S LEVER DOOR SPRINGS,
Coil, and Sabin's Volute Springs
For various purposes made to order.
SABIN MACHINE CO., Montpelier, Vt.

DOG COLLARS AND FURNISHINGS.



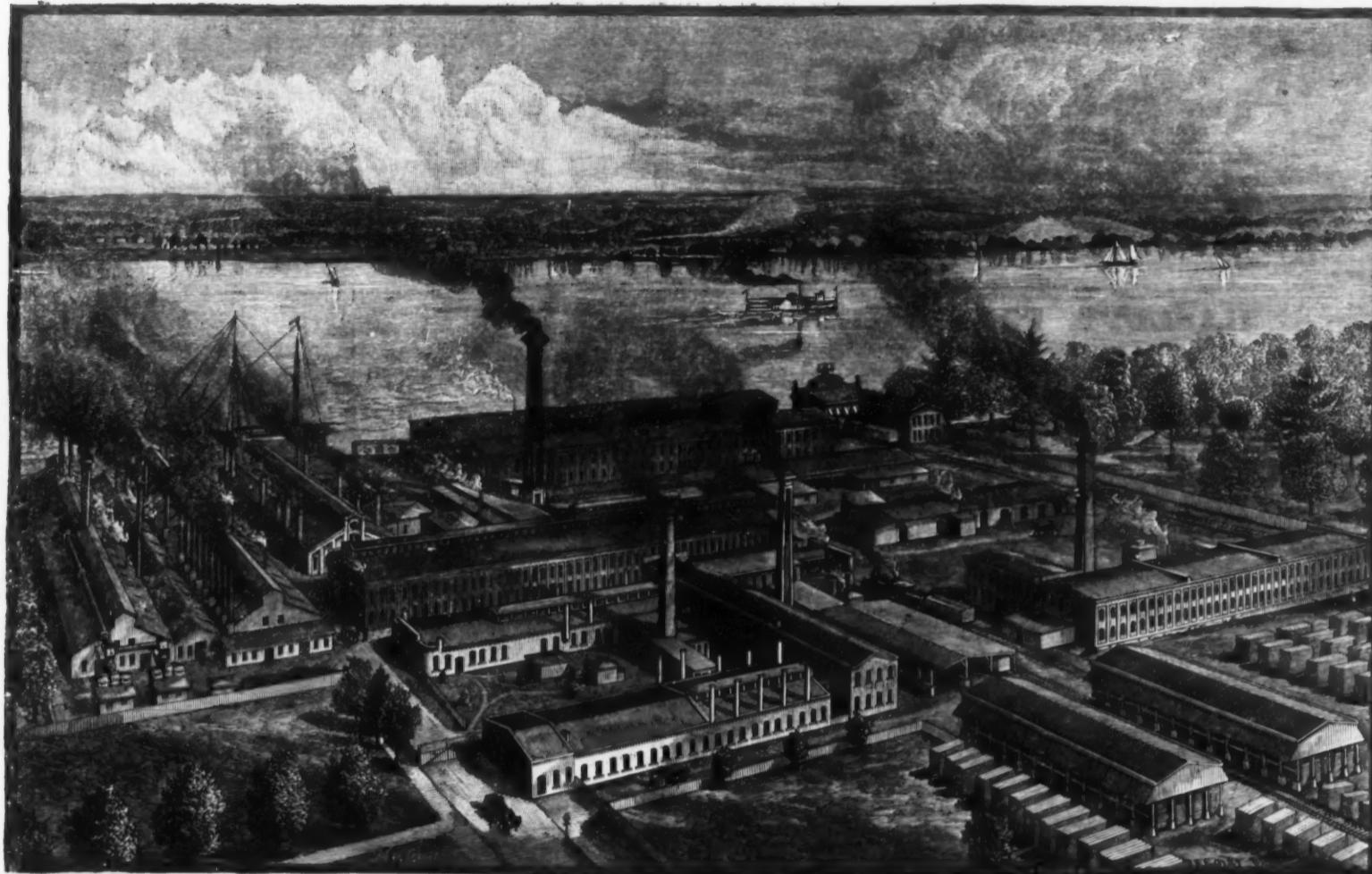
For full descriptions, prices, &c., send for our
1885 Catalogue and Discount Schedule.
MEDFORD FANCY GOODS CO.,
101 CHAMBERS STREET, NEW YORK.

I. BREMER, General Manager.

HENRY DISSTON & SONS



KEYSTONE SAW, TOOL, STEEL AND FILE WORKS, PHILADELPHIA, PA.



WE AGAIN DESIRE TO CALL THE ATTENTION OF THE TRADE to the goods manufactured by us, and assure them that it is our intention to maintain the present high standard of quality and to sell at the lowest prices consistent with superior quality and workmanship. Having had 45 years' experience in manufacturing Saws, we feel justified in saying that they are superior to all others from the fact of our having, by constantly experimenting at great cost, arrived at a state of perfection in machinery for manufacturing Saws which can only be attained by years of constant application and watchfulness. So jealous are we of keeping up their high standard that their making is intrusted to none but our most experienced men through their entire course of manufacture, several of whom have worked upon Disston's best grades for over 40 years, thus insuring, through long experience and constant attention, that perfection which cannot be attained in a few years, nor by those who are constantly changing their workmen. All goods bearing the brand of **Henry Disston & Sons** are fully warranted, and will be exchanged if found defective in any particular. We also manufacture a line of common Hand Saws, Buck Saws, &c., to which we call the attention of the Trade, as we are determined to sell these goods at as low a price as any of our competitors.

MEMORANDUM OF MEDALS.

HENRY DISSTON & SONS.

Franklin Institute, Pa.	1856, Silver.
Maryland Institute.	1860, Gold.
American Institute, New York.	1869, Bronze.
Franklin Institute, Pa.	1874, Silver.
Centennial, Philadelphia.	1876, Bronze.
New South Wales.	1877, Bronze.
Paris, France.	1878, Gold.
Paris, France.	1878, Bronze.

Sydney, New South Wales.	1879, Bronze.
Melbourne, Australia.	1880-81, Silver.
Matanzas, Cuba.	1881, Gold.
Altona, Germany.	1881, Gold.
Altona, Germany.	1881, Silver.
Atlanta, Georgia.	1881, Gold.
Louisville, Kentucky.	1883, Bronze.
Louisville, Kentucky.	1884, Bronze.

WE SHALL MAKE NO CHANGE IN OUR LIST OR DISCOUNTS FOR 1885. 

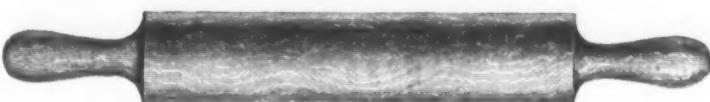
TUCKER & DORSEY MFG. CO.

INDIANAPOLIS, INDIANA.

MANUFACTURERS OF

Adjustable Stove Trucks,
Kraut, Slaw and
Vegetable Cutters,
Hoosier Saw Bucks,
Wood Saw Frames,
Towel Rollers,

ROLLING PINS.



No. 1, Maple Wood, Solid..... \$1.50 per dozen.
No. 2, " Revolving Handles... 1.75 "

JOHN H. GRAHAM & CO.,

113 Chambers Street, New York,

HEADQUARTERS FOR THE EASTERN AND NEW ENGLAND STATES FOR

Tucker & Dorsey Manuf'g Co.

MANUFACTURERS OF

Potato Mashers,
Rolling Pins,
Steak Mauls,
&c., &c.

Write for Catalogue and Prices.

EXCELSIOR AND CLIPPER LAWN MOWERS.

Excelsior Side Wheel.



For LIGHTNESS OF DRAFT, QUALITY OF WORK, SIMPLICITY OF ADJUSTMENTS and SUPERIOR WORKMANSHIP, our EXCELSIOR LAWN MOWERS, both for Hand and Horse Power, occupy the FIRST PLACE IN THE MARKETS OF THE WORLD.

Excelsior Roller.



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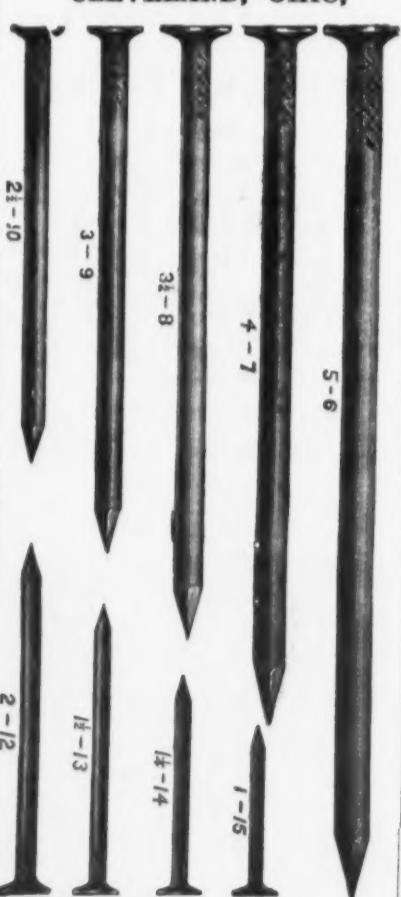
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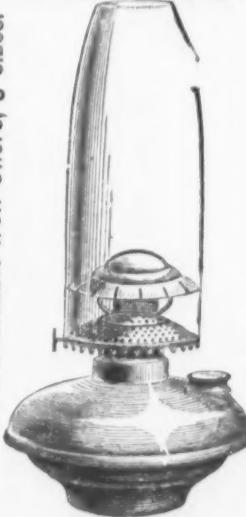
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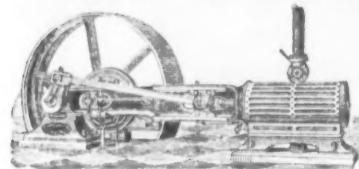


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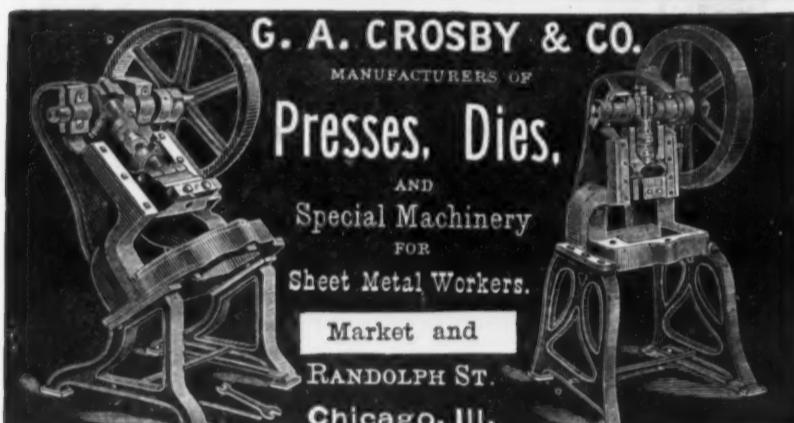
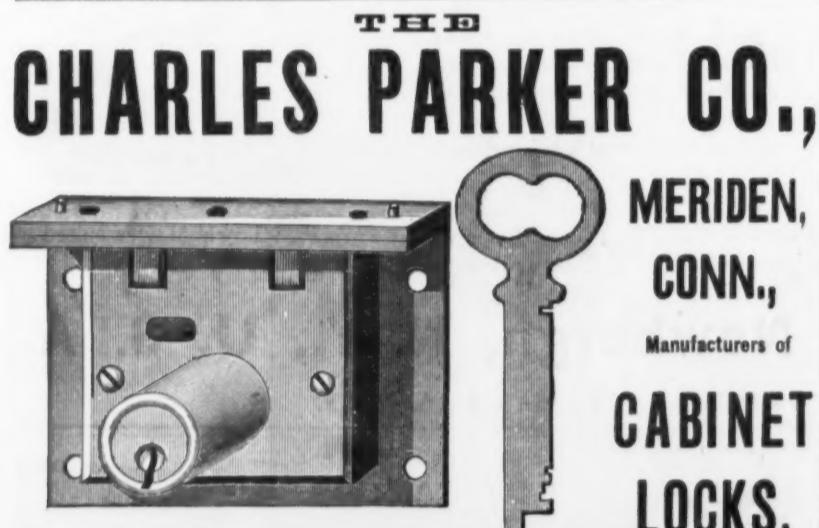
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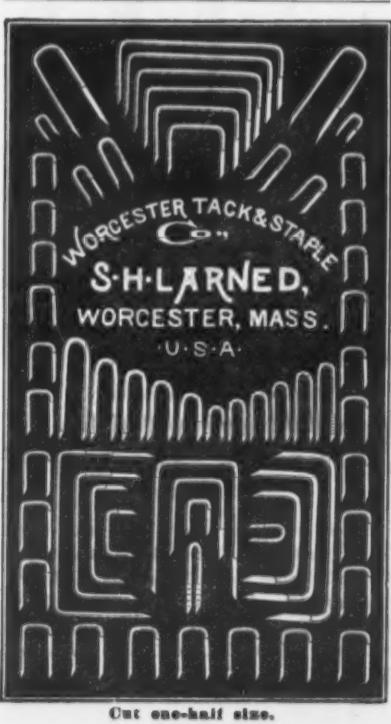
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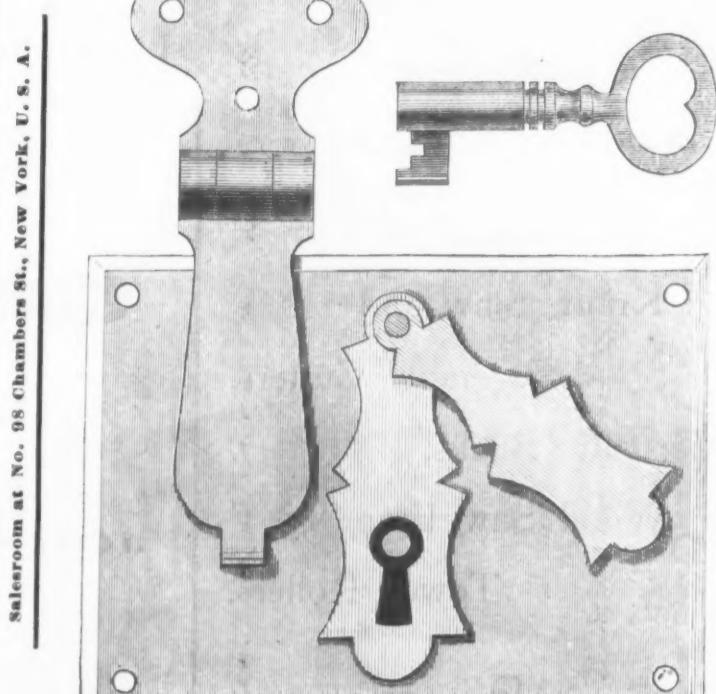
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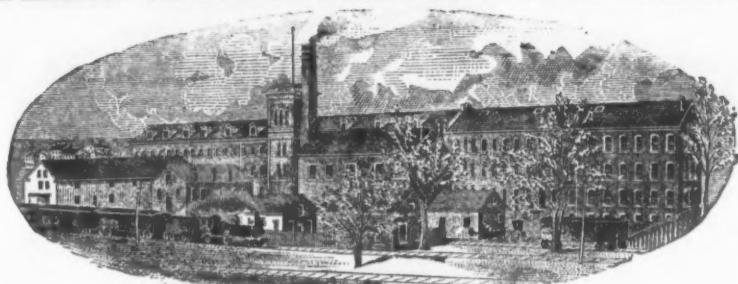
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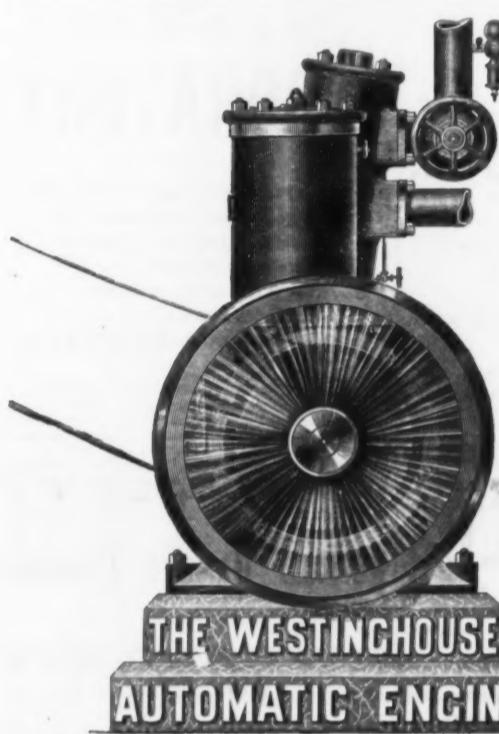
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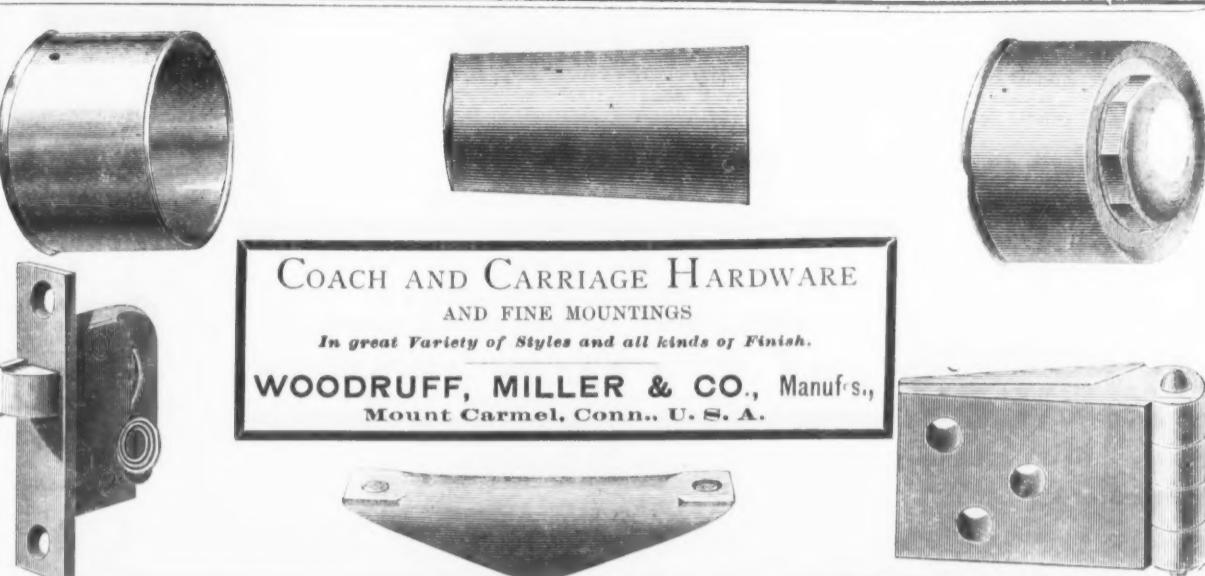
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NORTHFIELD KNIFE CO.

Superior Pocket Cutlery,

WITH HAND-FORGED BLADES.



Finest Quality Shears and Scissors,

FULL NICKEL-PLATED.

CHEMICALS AND APPARATUS

FOR THE ANALYSIS OF

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Our Specialty. Being direct Importers and Manufacturers we can offer superior inducements.

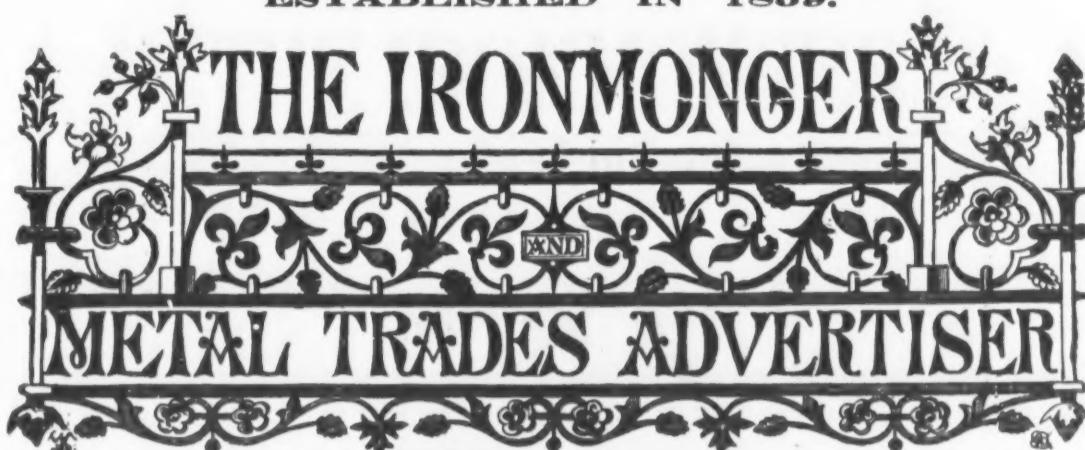
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Eighteenth Street Station Elevated R. R.

Illustrated Catalogue Mailed on Application.

THE LONDON IRONMONGER.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 42 CANNON STREET, LONDON, E. C.

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This is an annual, presented free to every Subscriber to the *IRONMONGER AND METAL TRADES' ADVERTISER*. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated **The Universal Engineer**,

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follows:

FEBRUARY 26, MARCH 25, APRIL 25, MAY 25, JUNE 25, July 25, AUGUST 25, SEPTEMBER 25, OCTOBER 25, NOVEMBER 25 and DECEMBER 26, 1885. This supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach, but in the native language of eighty millions of German, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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so far as our experience of more than twenty years is concerned, will be covered by *THE FOREIGN SUPPLEMENT* at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and *FOREIGN SUPPLEMENT* is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

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LEAD ALL COMPETITORS.

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ST. LOUIS, MO.,
MANUFACTURE ALL KINDS OF
**CASTER AND ADJUSTABLE
ROLLING COLTERS**
FOR WOOD OR STEEL BEAM PLOWS.
WRITE FOR PRICE LIST.



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MANUFACTURERS OF
Finest Grades of Steel

FOR WATCH, CLOCK AND OTHER SPRINGS,
Band Steel for Saws for Metal and Wood. Steel for all Mechanical Uses. The
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AGENTS FOR UNITED STATES AND CANADA
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J. E. REDFIELD,
MANUFACTURER OF
TAPS, REAMERS, SCREW PLATES, &c.
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Our Taps are all Machine Relieved, and we guarantee them to give satisfaction.



NOTICE.

The Sash Chains made from Morton's Metal under registered Trade-Mark, May 1, 1883, I guarantee is stronger than Phosphor Bronze Metal Chain, and is decidedly cheaper. Call and judge for yourselves.

THOMAS MORTON, Manufr.,

No. 65 Elizabeth St., New York.

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FIRE BRICK.**
BEST AND CHEAPEST.
Established 1845.
Office, foot of Houston Street, East River.
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MANUFACTURERS OF BEST QUALITY
FIRE BRICK
AND
STOVE LININGS.

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FIRE BRICK
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Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,
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Above Race, **PHILADELPHIA.**
Twenty years' practical Experience.

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TROY FIRE BRICK WORKS,
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MANUFACTURERS OF
FIRE BRICK,

Tiles, Blast Furnace Blocks, &c., and in a Special
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of superior quality. Manufacturers of and dealers in Wood-
bridge, N. J., Fire Clay and Fire Sand and Bitumen
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JAMES GARDNER,
Successor to GARDNER BROS.,
MANUFACTURER OF
"STANDARD SAVAGE" FIRE BRICK,
TILE & FURNACE BLOCKS,
OF ALL SHAPES AND SIZES
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20-inch Swing, with both
Worm and Lever Feed.



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Self-Binders' for The Iron Age.

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Full Cloth, \$1.25
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We are now prepared to supply our sub-
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We call attention to the low prices at which
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DAVID WILLIAMS,
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MANUFACTURERS OF

Drilled Cast Butt Hinges,
AND
"CHINESE" LAUNDRY IRONS, SAD IRONS, &c.

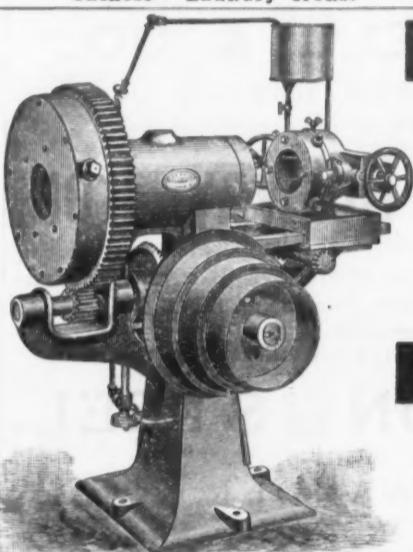


These "Chinese" Laundry Irons are of
superior quality, made from the best pig
iron, highly finished, and rounded on
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The Three Sizes, Nos. 1, 2 and 3,
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Dont You?
Have sufficient Pipe-Work
about your Mill, Factory
or Shops to make a Power-
ful, Convenient, and very
Compact

Pipe-Cutting Machine
Soon pay for itself?

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Further think it might pay
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MACHINES, for which we
claim many desirable fea-
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use. We build the "Eclipse" for both Hand and Power

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Pieper Breech-Loading Guns.

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WHOLESALE ONLY.

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LANE'S PATENT STEEL DOOR HANGER.

The most perfect Anti-Friction Hanger in the Market.

BECAUSE

It is made of steel throughout, except the wheel which has a
steel axle. It will not break. It is practically free from wear. It
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bearing on the door, and keeps in line. It is by far the most
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LANE'S PATENT TRACK

It is made of steel and is easily put in position. Catches and holds
no snow or ice. Door hung theron cannot jump the track. Is not
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Manufactured by **LANE BROS.**, Poughkeepsie, N. Y.

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PATENT OR FLAT BOTTOM.

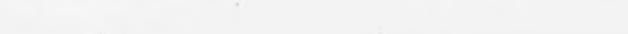
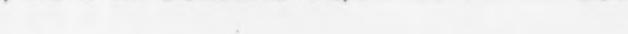
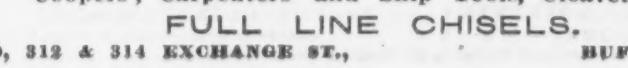
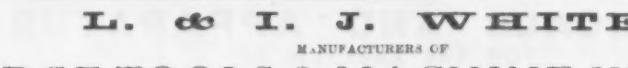
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Pat. Bottom have SAFETY FRONT.

Chemung Hollow Ware Works,

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ESTABLISHED 1837.



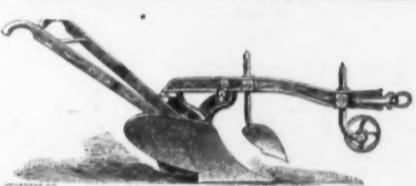
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STEEL BELVE, RUBBER CUSHIONED

TRUE, SQUARE, ELASTIC BLOW

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The Syracuse Steel Beam, Jointer and Wheel Standards.
CANNOT BE BENT OR BROKEN.

The Syracuse Sulky Plow
Is the Latest Improved and Best Riding Plow in the Market.

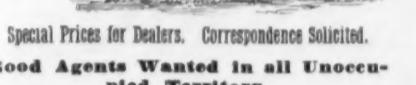
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SYRACUSE, N. Y.



The Syracuse Swivel Plows,
STEEL AND WOOD BEAMS.
Unrived in Reputation for their Good Working Qualities.

The Syracuse Steel Frame Cultivators
CANNOT BE EXCELLED.



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Good Agents Wanted in all Unoccupied Territory.

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SYRACUSE, N. Y.



Also Manufactured of the
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Send for Circular and Price List.

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The simplest, most perfect, strongest and cheapest Hangers for barns, houses, railroads, warehouses, freight and passenger elevators, &c., &c. **Hangers for large and heavy doors a specialty.** Also makers of Lock Joint, Round Edge Track, the Scranton Latch, Automatic Gate Hinges, &c. Illustrated catalogue sent on application.

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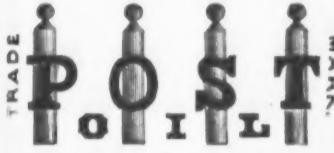
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Waterproof Belt Oil and Leather Preservative,

FOR WET AND DRY LEATHER
BELTING.



Registered in the U. S. and Great Britain.

The Standard Belt Oil of the World.

Leather dressed with this oil will not crack or rot, as heat, cold water or gas has no effect on it. It will spread one-third further and last much longer than any oil for the same purpose. It never turns rancid; will keep in any climate. Belts may be run in water at one end and a hot room at the other, and still be soft, dry and pliable. Warranted not to start glue-laps or gum on belts or pulleys, and to keep the surface perfectly smooth.

Beware of Imitations Sold at a Cheaper Price, the Color of which is well Calculated to Deceive.

In their Treatise on Machine Belting, **J. B. HOYT & CO.** speak of Post's Oil as follows:

OILING OF BELTS.

"Care should be taken that belts are kept soft and pliable. For this purpose we decidedly advise the use of **"POST'S WATERPROOF BELT OIL AND LEATHER PRESERVATIVE."** When applied as directed, it makes the belt smooth, pliable and adhesive, and causes it to hug the pulley closely, so that no power is lost from lack of pulley contact. It possesses excellent preservative qualities and also renders the leather more impervious to dampness than any article or preparation we know of.

Moisture should not be allowed to penetrate the laps or joints, as it will dissolve the cement and cause the laps to come apart."

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"If you cannot get POST'S OIL from your Belt Maker, send direct to us and we will see that you do get it."

PRICE, PER GALLON, \$1.50.

10 gallons, \$15.00... boxing and can, \$1.00.
25 " 37.50... no charge for 1/2 Blbs.
50 " 75.00... " " Barrels.

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No. 10 Peck Slip, New York,

SOLE MANUFACTURERS.

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THE Edison Shafting Mfg. Co.

MANUFACTURERS OF

TURNED STEEL & IRON

SHAFTING,

Couplings, Hangers, Pulleys, &c.

Also Agents for the Sale of

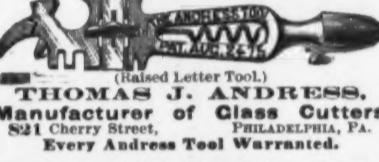
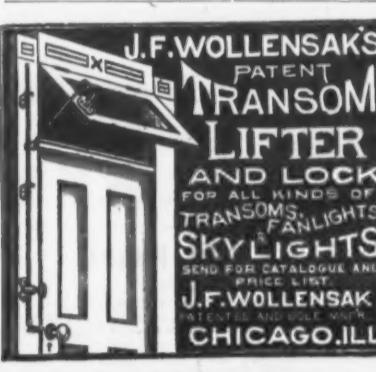
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made by Gautier Steel Dept. of Cambria Iron Co.

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At 86, 88 and 90 Goerck St.,

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Reported by Bigelow & Dowse.

Anvil & Vice.—No. 1, \$25; 2, \$45; 3, \$35 each.

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Jennings' Bits.

Cook's Bits.

Shepardson's Double Bit.

Shepardson's Double Gimlet.

Steens' Extension Hollow Auger.

No. 2, \$2 doz. \$48; No. 3, \$2 doz. \$60 list.

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Cast Angle (for Anti-Friction Hangers).

Cast Half Round.

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Japanned M. B. & D., reduced list, 1879.

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Cast Iron.

Gimp and Lace.

Cast Iron.

All Balance on list.

Traps.—Oneida, Genuine.

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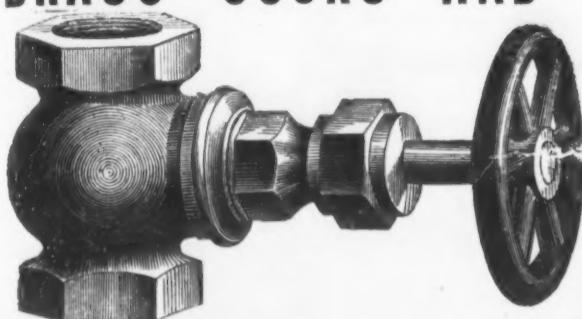
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McNab & Harlin Mfg. Co.,
MANUFACTURERS OF
BRASS COCKS AND VALVES,



For STEAM,
WATER,
and GAS
Wrought Iron
Pipe
and Fittings,
PLUMBERS'
MATERIALS.

56 John Street, N. Y.

Factory, Paterson, N. J.

Our new Illustrated Catalogue and Price List is now ready, and will be sent to the trade with their first order, or by express, if desired, before ordering.



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E. S. MASON, Treasurer.

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MANUFACTURERS OF

GIMLET POINT

COACH SCREWS



Bolts, Cold-Punched Nuts & Washers,

SUITABLE FOR MACHINERY OF ALL KINDS.

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HENRY B. NEWHALL CO., Agents,
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Philadelphia "STAR" Bolt Works.

NORWAY IRON



FANCY HEAD BOLTS.

Carriage & Tire Bolts, Star Axle Clips, &c.

TOWNSEND, WILSON & HUBBARD, 2301 Cherry St., Philadelphia, Pa.

TENSILE $\frac{1}{2}$ 56,000 to 64,000 lbs.
STRAIN. REDUCTION OF AREA—35 to 43 per cent.



WM. McILVAIN & SONS.

MANUFACTURERS OF

BOILER PLATE
AND
CHARCOAL BLOOMS.

Locomotive, Fire Box, Flange and Shell Iron; Plate for Bridges and Girder; Tank and Stack Iron; Boat Plate and Iron for Wrought Pipe; Plate Iron for Fire and Burglar-Proof Safes.

CAPACITY. Plates $1\frac{1}{2}$ inch thick to No. 14.
30 feet long.
70 inches wide.



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STANDARD
SCALES
AND
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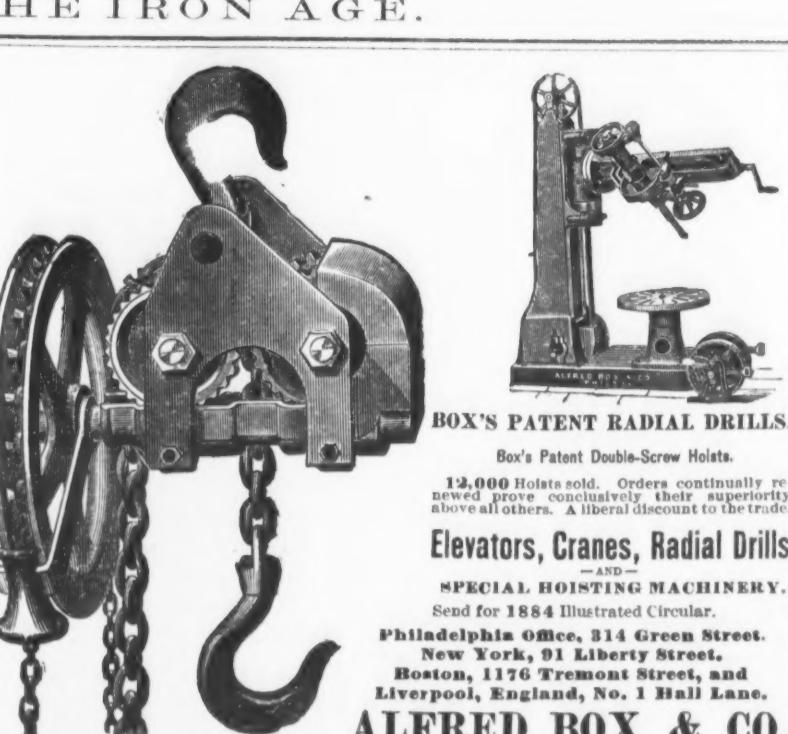
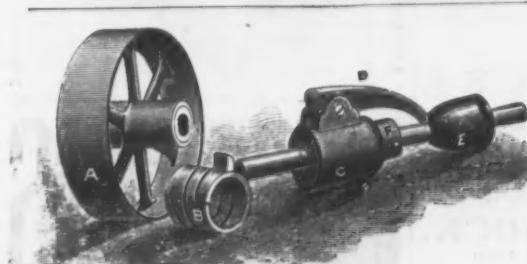
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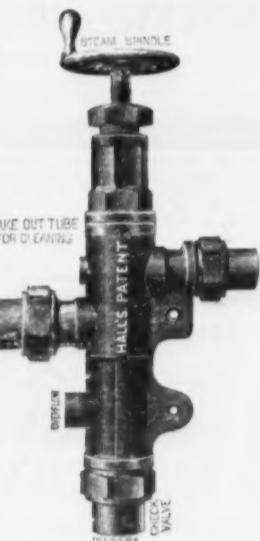
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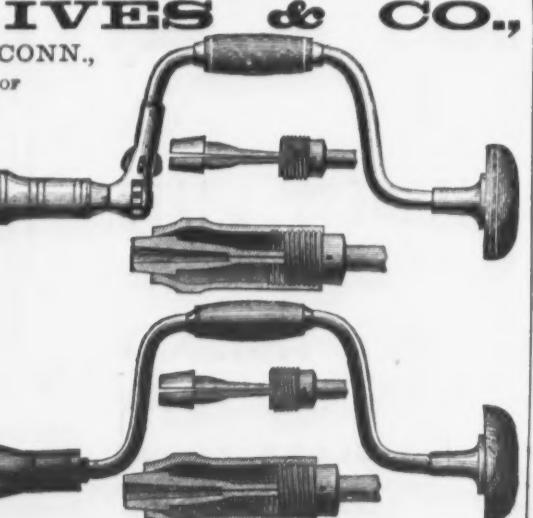
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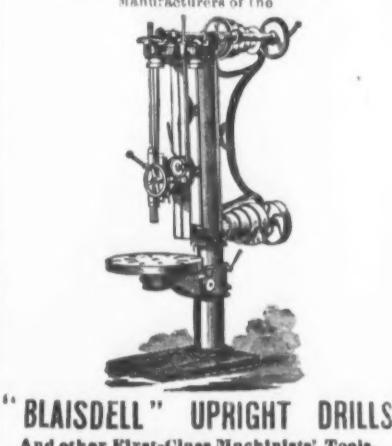
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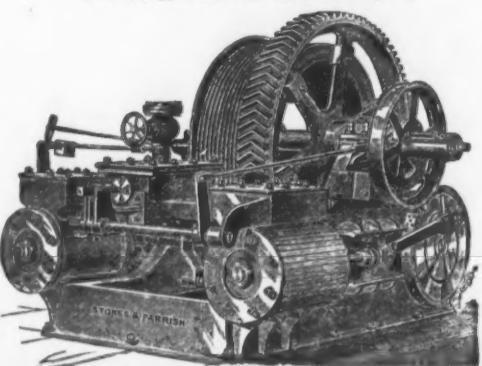


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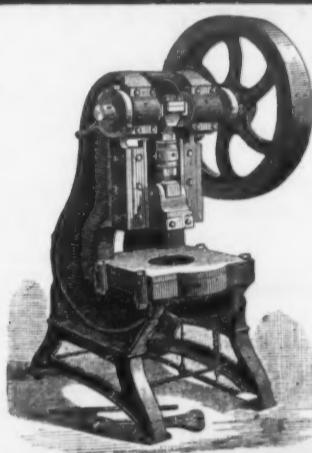
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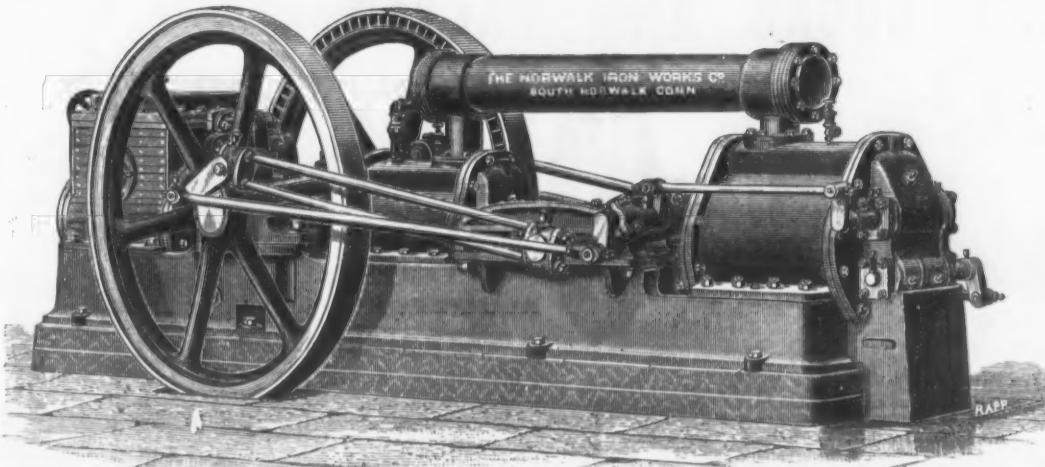
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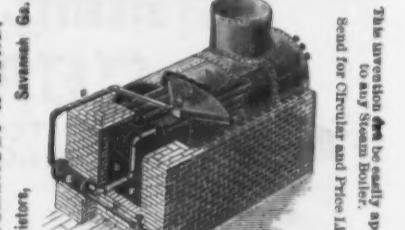
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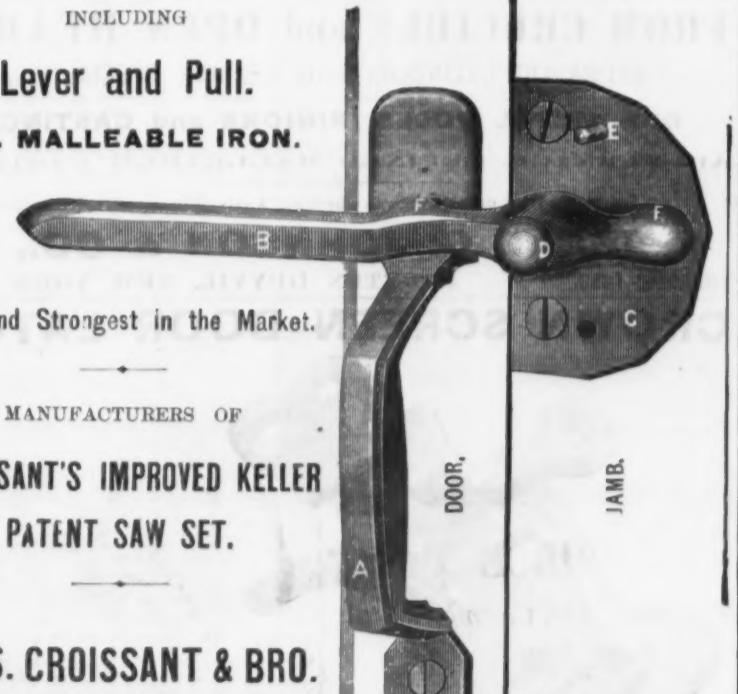
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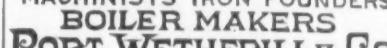


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